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On Communications

Hysterical Harry Newton

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EDITORIAL

IBM at the Helm Again

The difference between personal computers and CRT terminals is getting more difficult to define as the markets they serve merge and grow larger. Not surprisingly, IBM is the company best positioned to reap the benefits of this profitable communications market. The question is, how much of the profits will be left for the competition?

IBM has a widespread installed base of mainframe computers. Those computers communicate with CRTs and personal computers via the synchronous communications mode. Most non-IBM CRT terminals and personal computers communicate via the asynchronous communications mode. IBM dominates the market for synchronous CRT terminals and personal computers. This means that IBM controls an extremely lucrative market.

International Data Corp. estimated that, at year-end 1982, there were approximately 4,365,000 synchronous communications terminals installed vs. 3,124,000 asynchronous models.

IBM has a solid grip on the synchronous CRT terminal market with its 3270 family of terminals and controllers. Currently, over a million of those units are installed. The 3270 series may not represent the ultimate in CRT terminal and controller technology, but it looks good when you are seeking IBM mainframe compatibility.

Just as importantly, IBM CRT terminals and Personal Computers are conversant with IBM's aging, but still ubiquitous Binary Synchronous Communications (BSC) networking protocol and Systems Network Architecture (SNA), the hydra that is succeeding BSC. SNA is a de facto networking standard similar in many of its aspects to the Open Systems Interconnect model being hammered out by the International Standards Organization (ISO). It will continue to thrive even after the long-awaited ISO model finally comes to fruition.

The asynchronous manufacturers seemingly do not want anything to do with the synchronous IBM world, even though the synchronous terminal market is growing faster in terms of shipments. On the other hand, IBM has taken an interest in the asynchronous world, having installed 90,000 of its asynchronous 3101 CRTs.

So much for CRTs. What about personal computers? There is no question about the current impact and future prospects for these revolutionary devices. Some pundits have gone so far as to predict that personal computers will destroy the CRT market. This seems an unlikely forecast, but it is ominous, none the less, for CRT manufacturers.

IBM made its intentions in the much-touted micro-to-mainframe link known dramatically last Oct. 18. It introduced the Personal Computer XT/370 and 3270 Personal Computer as complements to its already successful Personal Computer and Personal Computer XT.

The XT/370 offers IBM 3277 CRT emulation and connectivity to 3274 controllers. In addition, IBM says it offers roughly half the internal performance of the IBM 4321, a low-end mainframe. Beyond that, the XT/370 reportedly permits users to run many 370, 4300 series and 30 series programs unchanged on their desktops under the VM/CMS operating system. Users can access mainframe applications and concurrently use those applications with programs running under Microsoft, Inc.'s PC-DOS, the primary operating system for IBM's Personal Computer and Personal Computer XT.

The 3270 Personal Computer is said to let users access multiple host processors while retaining local computing powers. It offers the ability to run up to seven applications concurrently, four of which can emanate from a larger host such as 4300 or 3080 series processors.

Furthermore, the IBM machines may be modified for asynchronous communications with the addition of a card.

The announcement of these two products made life even more difficult for competing personal computer vendors. In the past, they could claim Personal Computer and Personal Computer XT emulation capabilities by modifying their microcomputers to act as dumb 3270-type terminals. Now that the ability to access mainframe applications running under VM/CMS has been added to the IBM repertoire, the competition has to go back to the drawing board and duplicate IBM's feat. In the meantime, IBM will be out selling computers.

IBM has put together an impressive line of products designed to sew up the IBM synchronous CRT terminal and personal computer marketplace. It seems well on its way to doing just that.

Computerworld On Communications

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In what areas do you see AT&T and IBM competing in the future?

Robert Pfluger, technology adviser, Shell Oil Co., Houston:

"Computers and telecommunications. With computers, AT&T will be in the microcomputer business within a year and potentially into large-scale computers later. IBM will be into the conventional telecommunications business through its association with Rolm [Corp.]. As to who will get what, I think both will retain strength in their respective areas of business right now. As for whether IBM will become a leader in communications and AT&T will become a leader in computers, I cannot say. It is too soon to tell."

Howard Talesnick, director of systems, Martin E. Segal Co., New York:

"It's a very serious question. The only thing that occurs to me is the development in hardware and what IBM is doing there. IBM has built its Information Network, and the acquisition of, or integration with Rolm, certainly makes it look like IBM is going after the communications market that has traditionally been served by AT&T. But AT&T is coming out with its own Unix-based hardware, and there has been talk about IBM coming out with hardware working with Bell's Unix system.

"I don't see how anyone can talk about forecasting market share, when there are so many developments taking place. AT&T comes out with hardware, and IBM expands its Information Network for communications. Obviously, these are areas of competition, but the future depends on the product development. For the most part, it will be a self-fulfilling prophesy. It also depends on how you define the market — the total computer market or just one piece.

"Obviously, the outsider's perception of what is taking place is that it looks like two types converging toward the same market. But that is superficial analysis. They happen to be getting closer to offering the same kind of utility. Obviously, it is incidental to their existing product line. I mean, how much is communications a total percent of IBM's business? And how much is AT&T's hardware business related to the whole communications business?

"Obviously, people have the expectation that they will be confronting each other. But what actually emerges depends on their own business plans and on what products they announce and implement."

Robert Handal, manager, telecommunications network services, Mobil Corp., New York:

"Right now, I think IBM has to sort out what to do with Rolm. I don't think IBM has its strategy set as to exactly how it is going to deal with Rolm. It is not clear how it will present that combination of organizations. I can see AT&T is still going to be dominant in communications. It has the network and research. I don't think Rolm can compete with that. I do feel, however, that IBM will have its edge because it has its [Systems Network Architecture] and hardware devices and every aspect of communications except the long lines network and [private branch exchanges (PBXs)].

"More and more, the PBX — which is what Bell is very good at — is looking like a computer. That will help Rolm in its relationship with IBM. Maybe then it can have a very serious effect, take an important market away from AT&T because of the switch.

"But I don't think that will occur because IBM has not sat down with its strategy board and said exactly what portion of the market it is going after and how it is going to do it.

"You will never knock IBM out of the computer area. It is only where the two meet that matters. IBM bought Rolm for the switch. It has everything up to the switch. AT&T has the network and the switch. They will only compete if they add things to the switches. IBM doesn't care as long as it is compatible with their products."

Tad Davies, manager of network communications, Bechtel International, San Francisco:

"IBM, of course, is part owner of Satellite Business Systems [SBS] right now. And I think that the role of communications — the PBX-type telephone communications and satellites — those are going to be the two disciplines of communications in computing, with a merging in the office workstation area. I believe that both of them will be the leaders in that field.

"I don't know if either one will take a dominant position. IBM

has a head start on personal computers, but as soon as the unregulated portion of AT&T is unleashed, it will be in that arena as well. In areas like that, one will be No. 1, and one will be No. 2. I doubt either will have the majority of the market. Of course, IBM has the head start: It will be tough to beat the Personal Computer.

"AT&T telephone stores will become computer marts, so to speak. I cannot really see AT&T getting into the large-scale mainframe business, but I can certainly see it getting into office automation and the movement of information. They both will be in that, and they will be in it rather heavily."

Edith Clouse, data communications analyst, Stauffer Chemical Co., San Francisco:

"I think IBM will possibly be entering the PBX market. I wouldn't be surprised if AT&T came out with some form of personal computer. It will definitely be entering the data processing market. I doubt AT&T would get involved in large mainframe computers.

"IBM might take away market share in the PBX area. In the microcomputer business, the market is still growing — the base market. But telephone systems are not new, and it is just a matter of getting new, better ones."

Thomas Isaacson, manager, telecommunications, SCM Corp., Stamford, Conn.:

"Competition between the two will be aggressive. It will be broader than competition with equipment, too. AT&T and IBM will both compete across the whole broad range of information management and transfer, and no area will be specific with either one of them. They will compete in all areas: That is their goal. Both want to offer a full range of capabilities, which includes all the traditional telecommunications capabilities and office automation, personal computing — those things.

"I think IBM will try to increase its percentage of ownership in telecommunications, either through acquisition of existing companies or by establishing its own capabilities. AT&T already has large mainframes. Now, it is a matter of making them available to users. AT&T has electronic switching systems that are enormously capable computers, but I do not think it will come out with mainframes to put on customer premises. Instead, AT&T will offer computing capabilities to users.

"I think both AT&T and IBM will become information processing companies; the distinction between the two will disappear."

Thomas Cooley, telecommunications consultant, General Mills, Inc., Minneapolis:

"Obviously, IBM is going to be in the telephone marketplace in the next couple of years, considering its association with Rolm. It will be interesting to see what kinds of products they bring into the marketplace. Through SBS and yet-to-be-announced divisions, IBM will start to offer value-added network capabilities. I think AT&T will try to compete in that area with their Net/1000 as well.

"But I think AT&T is behind in the terminal equipment area. And we will probably see more product announcements out of AT&T in the next couple of years. I do not think the System 85 is competitive yet. We will see replacements for its Horizon PBX system and expanded system products that go into larger line sizes. We will also see a personal computer from AT&T — probably in the next six months."

LETTERS

'Is It Worth Doing?'

I would like to compliment you on the content of your September 28, 1983 *Computerworld On Communications*. The quality of the articles and their pertinence to today's business communications managers was exceptional.

In particular, the article entitled "Myths Behind Voice and Data Integration" by William Zachmann was noteworthy in that it addressed a viewpoint that has been hidden in the current media hype over data and voice integration in new private branch exchanges (PBXs). It is a valid editorial responsibility to expose the user to his need to ask, "Is it worth doing just because it can be done?" This article clearly suggests the jury is still out on the viability of the data and voice PBX solution to today's problems.

We look forward to your increased publication schedule in 1984.

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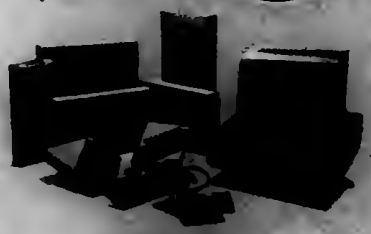

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ALAN PEARCE

AT&T at the Regulatory Forge

Regulation — or the lack of it — is the single most important element influencing the future success of AT&T Communications, the successor to AT&T's Long Lines Division that is responsible for providing long-distance services. Competitors are fighting their battles against AT&T Communications before the Federal Communications Commission (FCC), the courts and Congress.

The prospects for approval of AT&T's massive tariff filing submitted before the FCC on Oct. 3, 1983 and slated for implementation this April 3 look good. This is because the proposed tariffs are fair. They were developed by AT&T under the intense scrutiny of the Justice Department, the FCC, AT&T's competitors, AT&T's customers, Congress and U.S. Federal District Court Judge Harold Greene, who is monitoring the Bell System breakup. The tariff filing was subjected to intense scrutiny, so it is highly unlikely that AT&T Communications made the tariffs anticompetitive.

Naturally, the tariffs are being strenuously opposed by AT&T Communications' competitors because, for the first time, there is going to be real competition in the toll telecommunications services market. These competitors want to keep the edge in pricing.

In addition, AT&T Communications will seek substantial deregulatory relief from the FCC over the next five years, looking ultimately to total deregulation. Prospects here also look good, as long as the FCC is headed by current Chairman Mark Fowler, a strict advocate of deregulation. "We are headed ultimately toward a regulation-free telecommunications marketplace," Fowler said. "Society deserves the benefits — not later, but now."

AT&T Communications is working toward that goal by lobbying for the deregulation of the introduction and pricing of new services in the marketplace. It also wants reduced FCC tariff requirements and the elimination of the long delays inherent in the compilation of supporting data in tariff and other filings. It will also seek forbearance from service-by-service regulation, which requires that rates for different services be set to produce equal earnings. It will also move quickly to define a set of existing services that should immediately be deregulated, including certain private-line and satellite-based services.

But this strategy would merely preface a huge effort to become totally deregulated at both the state and federal levels over the next five to 10 years. Fowler has already announced that he plans to launch an inquiry seeking to deregulate AT&T Communications totally. This plan is expected to result in monumental opposition not only from competitors such as MCI Communications Corp., GTE Sprint Communications and others, but also from the many major customers of AT&T Communications.

ILLUSTRATION BY DAVID E. KANN ASSOCIATION

Deregulation at the state level will probably be even more difficult, and AT&T Communications' current approach is to concentrate first on federal deregulation and then on a state by state reduction in the level of regulatory oversight. Before Jan. 1, 1984, AT&T Communications offered only interstate services and was only subject to FCC oversight. As a result, it is totally new to state regulation.

However, AT&T Communications' first concern is early FCC approval of its new tariff filing. It wanted to implement these tariffs by Jan. 1, 1984. Because of the complexity of the proposed tariffs, the FCC pushed that date back to April 3. At that time, AT&T Communications will begin a three-year effort to fight the competition head to toe.

Beginning in 1984 and continuing for a period of six years, the FCC will incrementally eliminate the $11 billion to $12 billion in annual subsidies that have traditionally gone from toll services to local telephone companies by increasing customer payments. In 1984, the local telephone companies will recover 40% of interstate nontraffic sensitive costs from customers in the form of a customer access line charge. The remaining 60% will be recovered from the interexchange carriers through the imposition of interstate access charges. However, the FCC mandates that the customer recovery must grow from 40% to 100% over the next six years, while the interexchange carrier recovery will diminish to zero.

The current pricing advantages of AT&T's competitors will erode over the next three years, assuming that Congress fails to act. Over that period, AT&T Communications has to pay the local telephone companies a premium. The reason behind this is that AT&T Communications enjoys superior connection capabilities. The premium is designed to give AT&T Communications' competitors a discount of 35% in 1984, 23% in 1985 and 12% in 1986. It will be terminated on Aug. 31, 1986, when the local telephone companies must provide equal access to all interexchange carriers.

The competitors are concerned that their costs are bound to rise over the next three years, while AT&T Communications' costs will fall dramatically. In the predivestiture environment, the Long Lines Division shouldered the vast majority of the subsidy flowing from toll to local service. Long Lines paid this subsidy on the separations and division of revenues process. The competitors paid for access to the local exchange companies based on the Exchange Network Facilities for Interstate Access (Enfia) tariffs, which were about 45% less than Long Lines' comparable costs. This equated to an average charge of 15 cents per minute for AT&T, but only 5 cents per minute for its competitors. This gap allowed the competitors to charge users less than AT&T for long-distance services.

In 1984, however, all of this will change. AT&T's competitors will have to pay a local exchange access of approximately 7 cents per minute, while AT&T Communications will pay a tariff of between 8 and 9 cents a minute.

There is a distinct danger that some of the competitors may be forced out of business. They are attempting to fight the implementation of AT&T's new tariffs, the deregulation of AT&T Communications and the elimination of the favorable Enfia tariffs.

Although H.R.4102, the Universal Telephone Service Preservation Act, has already been passed by the full House of Representatives, and its companion measure, S.1660, has been approved by the Senate Commerce Committee, it is unlikely that a single measure will emerge in the near future.

If enacted, bills such as H.R.4102 and S.1660 would significantly weaken the competitive position of AT&T Communications. They abolish the $2 and $6 per month customer access line charges for residences and single-line businesses, perpetuating the subsidies that AT&T Communications would have to pay to the local telephone companies. In addition, they perpetuate — at least for now — the Enfia tariffs, giving AT&T's competitors a 45% discount on the offering of interstate telecommunications services. This is substantial compared with the 35% discount going down to zero over the next three years.

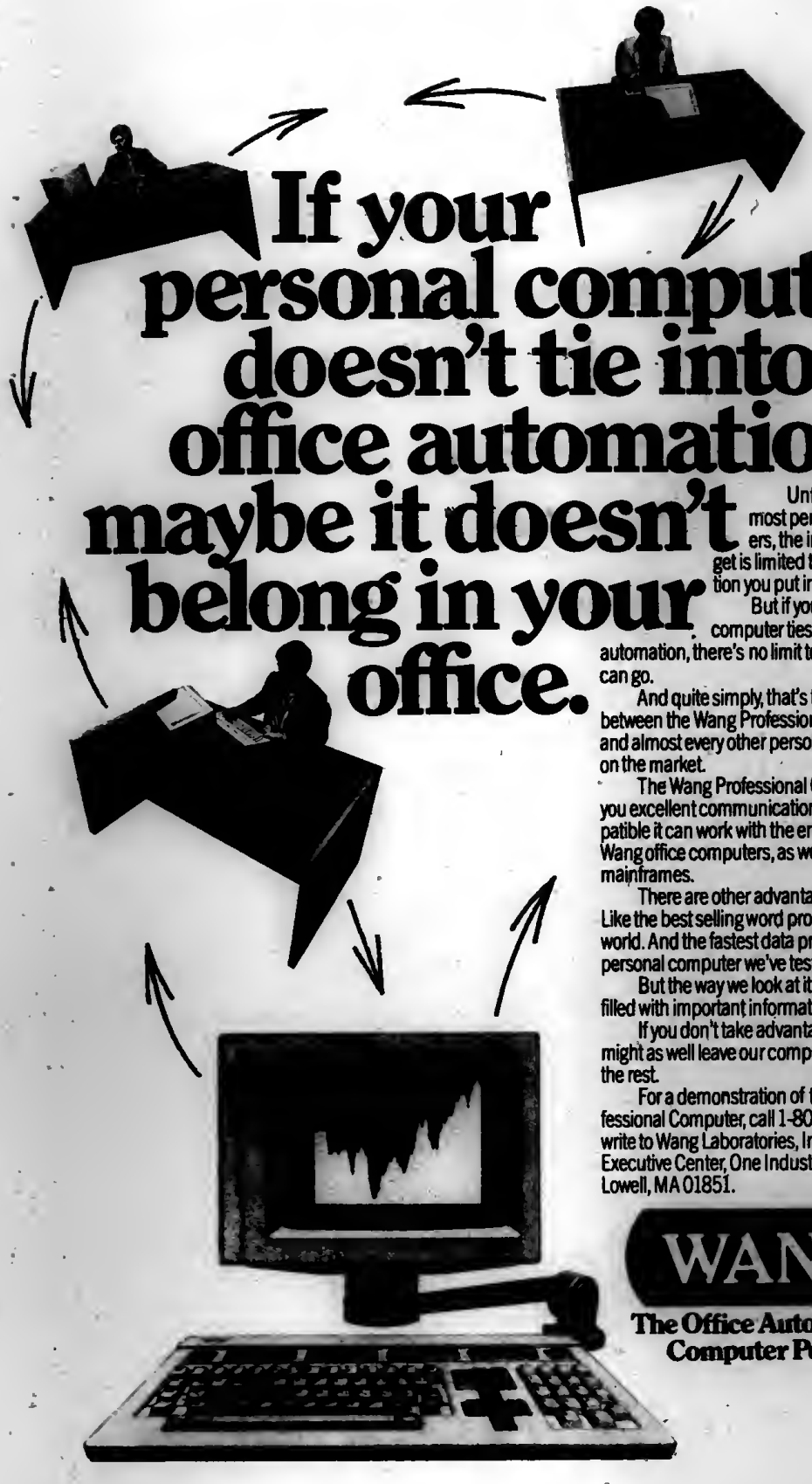
Sen. Howard Baker (R-Tenn.), the Senate leader, has promised that he will bring S.1660 to the floor of the Senate as soon as possible in January. But it is understood that the White House — which is strongly opposed to legislation weakening AT&T's competitive position — has instructed him to stall in order to kill any legislative initiative in 1984.

As a consequence, it appears that the possibility of legislation being passed in 1984 has been substantially reduced. The best time to get a bill through was before the Christmas recess. Once this failed, it gave AT&T Communications additional time to mount a massive lobbying effort against legislation.

The future looks good for AT&T Communications.

Assuming early implementation of its tariffs and no legislative restrictions on its operating flexibility, AT&T Communications will remain the dominant long-haul telecommunications carrier. Its competitors had better look out — the future for them is going to be hazardous and risky. ■

Pearce is president of Information Age Economics, Inc., Washington, D.C.



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DEATH OF THE RESELLERS?

BY DON GOODING

Resellers were born from regulatory changes, and most will eventually perish from regulatory changes. The long-distance resale business began in 1981, when the Federal Communications Commission (FCC) allowed AT&T's Wide Area Telephone Service (Wats) and Message Toll Service (MTS) to be resold. About 200 resale common carriers, or resellers, are providing long-distance communications service today, with more companies entering the business each week. In spite of the recent entrepreneurial boom, though, resellers face an uncertain future. The Yankee Group expects only 20 to survive until 1988, with many facing potential extinction in the next two years — unless Congress comes to the rescue.

Resellers differ fundamentally from AT&T and other common carriers such as MCI Communications Corp.; they do not have networks. Instead, ▶

they resell the other carriers' network facilities, primarily AT&T's Wats facilities, but also private lines and switched services (see figure on Page 14). This distinction is beginning to blur since other common carriers such as MCI also resell Wats, and a number of resellers are building their own microwave and satellite links. In general, though, resellers can be characterized as packagers and resellers of others' networks.

Two conclusions can be drawn about the current and future state of the resale industry. First, the reason for the existence of resellers is, at least partially, the artificial gap between low-cost interstate private lines and Wats and higher cost MTS services. Resellers make their living marking up wholesale prices and selling services to users that could not economically use the same services if bought directly from AT&T.

Second, the gap between wholesale and retail prices will narrow in the future. Resale common carriers must develop distinctive services and build capacity in order to survive in the long term.

Four sets of issues will have direct bearing on the future success of the alternative carriers. These are:

- Divestiture;
- Entrance Network Facilities for Interstate Access (Enfia) and access charges;
- Federal and state regulation;
- Rate restructuring.

The Modified Final Judgement between AT&T and the Justice Department, issued last Aug. 11, stipulates that all long-distance carriers must be treated equally by the divested Bell operating companies. All central offices must offer nationwide equal-quality interconnection to the operating companies by no later than Sept. 1, 1986.

Many Bell operating companies will offer equal access to other common carriers and resellers much sooner than that, especially in major metropolitan areas, although rural areas may not see equal access until 1990.

The most important change for resellers will be dialing parity. Instead of dialing up to 15 digits to access long-distance lines, resell customers will have to dial only four. Here's how it works: The operating companies will offer what they call "10XX" access to interexchange carriers. Under this scheme, all users will dial 10, but the next two digits dialed — the XX part of 10XX — will connect the user with one of up to 99 carriers.

In order to access customers, resellers are dependent on the facilities of local telephone companies. The price the alternative carriers should pay for these local facilities has been hotly debated since the industry's inception.

Local loop use is currently paid for under the Enfia tariffs filed by Bell and independent operating companies. Pure Wats resellers are not subject to Enfia tariffs, since the Wats rates already incorporate a subsidy for the local loop. However, since most large resellers use satellite and

The reason for the existence of resellers is, at least partially, the artificial gap between low-cost interstate private lines and Wats and higher cost MTS services. But the gap between wholesale and retail prices will narrow in the future.

FX lines, they are subject to Enfia for traffic routed to those services. The current rate is approximately $234 per month per line.

The FCC has developed a system of access charges that will replace Enfia and the separations and settlements procedures formerly used to provide a toll-to-local subsidy for the telephone companies.

The proposed charges, known collectively as carrier access elements, were filed on Oct. 3, 1983 and are scheduled to take effect on April 3, 1984. As a result of these new charges, end users will pay access charges, but the bulk of the local loop costs will still be borne by the interexchange carriers.

The proposed rates in some states not pooled with the ECA are triple the ECA rate. Interexchange carriers should examine the justification for these rates closely and challenge them if errors are found.

AT&T also filed new tariffs for all of its services last Oct. 3, and those are also scheduled to be implemented this April 3. These tariffs will be examined later in this article.

The carrier access elements — which do not apply to pure Wats resellers or resellers of MTS or Wats-like services — are divided into four categories. These are common line, end office, transport and other. The last category will not be discussed in this article.

■ *Carrier common line charges.* Every interexchange carrier will pay a per-minute charge for use of the local loop at each end of an interstate call. The carrier common line charge for AT&T will be 4.61 cents per minute at each end. Other common carriers — including MCI, GTE Sprint Communications and resellers such as U.S. Telephone Communications, Inc. — will receive a 35% discount off that amount. Every Bell and independent telephone company will charge the same rate, as their costs and revenues will be pooled by the Exchange Carriers Association (ECA). However, for the other three carrier elements, rates can and will vary significantly from state to state.

■ *End office charges.* The end office charges include elements for line termination, local switching and intercept. These charges add up to roughly 1.5 cents per access minute or 3 cents per conversation minute. Resellers and other common carriers except AT&T Communications will receive a 35% discount on the switching elements, at least until equal access is implemented.

■ *Transport charges.* A major cost disadvantage for resellers will come from the transport charges. These rates cover the cost of delivering an interstate call from the rate center in which the customer is located to the rate center in which the interexchange carrier's closest point of presence is located. The rates vary with mileage; for example, a reseller will pay .44 cents per minute to serve customers less than one mile away from its switch, but will pay 1.26 cents per minute for customers 20 miles away.

The proposed rates in some states not pooled with the ECA are triple the ECA rate. Interexchange carriers should examine the justification for these rates closely and challenge them if errors are found.

DEATH OF THE RESELLERS?

An extra 2 or 3 cents per minute could severely decrease a reseller's profit margin.

Some of the proposed access rates filed are averaged across the country, meaning they are the same in every area of the country even though costs of service may vary from one area to another. Carrier common line charges are an example of this phenomenon.

Other access rates are averaged among a pool of telephone companies, and others are averaged within a study area. In most cases, this area is a telephone company's operating area within a single state.

Rates may be deaveraged in 1985 and beyond. Deaveraging closes the gap between charges and costs by allowing carriers to charge rates that compensate for costs in any given area. For example, carrier access elements could be charged in accordance with the time of day calls are placed. Such disaggregation was not encouraged for 1984 in the interest of simplicity. Deaveraging access charges could require tremendous amounts of paperwork, greatly increasing the complexity of establishing tariffs.

Federal regulators have been backing away from the resale industry since its inception. The Competitive Carrier Ruling adopted by the FCC in July 1982 endorsed the concept of forbearance for regulating resale carriers. That concept maintains that there will be no active regulation of resellers, but also stipulates that they must provide equal service at equal prices to all customers. The primary result of forbearance is that resellers do not have to file Section 214 applications, which are required for construction of common carrier facilities, and they no longer have to file tariffs.

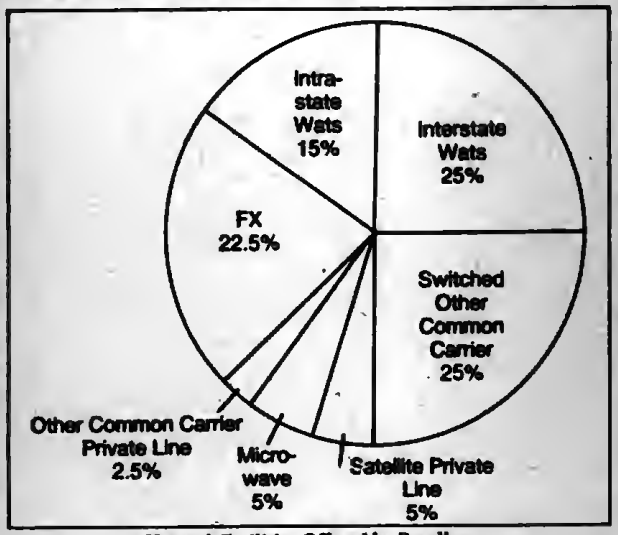
State regulations are much more important to the resellers' future, since the resale of intrastate service is crucial to the viability of these carriers. Approximately 20 state agencies have allowed the resale of intrastate circuits, and the Association of Long Distance Telephone Companies (Altel), the reseller's trade association, has been working to open up other states.

Measured Wats rates are based on the amount of calling time used. Wats service based on a flat rate is also available. In most states, Wats resale is allowed only after measured Wats is implemented. But there are exceptions. Resale is allowed in Florida, but there has been a cap on the maximum monthly Wats bill of approximately $1,300. Resellers filling up measured Wats beyond that maximum essentially receive free service. This is one reason Florida is a hotbed of resellers.

On Oct. 3, 1983, AT&T Communications filed a 200,000-page proposal covering new rates for every service it offers, taking into account divestiture, access charges and changing costs. Specifically, proposed MTS rates will still be averaged, but charges for them will be decreased by approximately 10.5%, with the largest decrease for longer calls in the 431- to 925-mile band. In addition, proposed AT&T Wats rates will drop by an average of 6.9%, with the biggest savings for heavy Wats users. Proposed private line rates, as a whole, will see increases averaging 15%, although there are significant variations between services.

The scheduled implementation date for the proposed rates is April 3. All of them were suspended for investigation, and many are not expected to be approved.

If AT&T's MTS rates remain averaged, as the company has proposed, its night and weekend rates will barely cover the cost of line access — let alone other calling costs — while its business-day rates will produce a healthy profit. In 1984, a marginal increase in late-night traffic volume produces no extra profit (and perhaps even a loss), while a marginal increase in business day traffic is extremely profitable. Until access charges are changed (deaveraged) to reflect time-of-day use, AT&T Communications' marketing strategy will be driven by this price distortion. This can have serious effects on the competition.



Network Facilities Offered by Resellers

Other common carriers and resellers will have to price their services similarly and will be forced to pursue business traffic and shy away from residential traffic. As a rule of thumb, carriers with a higher proportion of residential traffic will be under more earnings pressure than those emphasizing the business market. The impact of Wats rates on users depends on the volume of use. In addition, 20% of all access lines — those used under 10 hours per month — will see rate increases, reflecting the higher flat monthly fee. Users and resellers should note that AT&T did not attempt to increase its nationally averaged local access fee of $31.65 per month — except to add the $25 per month surcharge — because it had insufficient information on what the Bell operating companies would charge. This charge is certain to go up, raising Wats rates from the level filed on Oct. 3.

It is also worth noting that AT&T did not try to eliminate Wats as a service distinct from MTS. While Wats has a reprieve from regulatory scrutiny while the FCC recovers from this year's filings, I believe Wats will eventually be consolidated with MTS — perhaps by 1985, but more likely not until 1986 or 1987.

The FCC has been trying to determine the lawfulness of Wats tariffs ever since they were filed in the early '60s. In its current stage of investigation, the FCC is looking at the potential for a unified public-switched network tariff. While such a tariff would merge Wats and MTS, AT&T has indicated the tariff would include a discount for volume use. Thus, resellers could still receive a discount (although probably a smaller one) even if Wats were merged with MTS — and if AT&T's bulk discount were approved by the FCC.

If AT&T's new tariffs are approved, voice-grade, private-line rates would increase significantly — 25-mile links by 61% and 500-mile links by 18%. Since many resellers use FX lines from AT&T, especially short ones in their regional networks, this rate hike will have a significant negative impact on the bottom line.

I have been anticipating a margin squeeze as a result of the post-divestiture rate changes, but the rates filed by the Bell operating companies and by AT&T Communications indicate a somewhat less severe impact than expected.

There are several negative factors involved:

- The price differential between the bulk capacity purchased (private lines and Wats) and the primary competing service (MTS) has been narrowed, slightly in the case of Wats and severely in the case of private lines.
- Resellers' regional traffic patterns require short private lines, for which the proposed rate increases were the highest.
- The carrier common line usage charge will significantly raise the cost of local access for companies reselling more than just Wats — for example, most large resellers.
- The local transport component of access charges will hit resellers and other common carriers hard, because they have few points of presence and a longer average distance between their switches and their customers.
- AT&T pricing does not cover the cost of access for marginal night and weekend calls, forcing resellers and other common carriers to base their pricing on accurate estimates of their time-of-day traffic mix.

The factors on the positive side are:

- Heavily loaded Wats lines would see rate decreases of about 10%, very close to the average MTS price cut of 10.5%.
- Transport circuits will be available at a slightly lower monthly rate than private lines for resellers that have the technical expertise to support them.

Overall, I expect that resellers' profits will be tightly pinched, if not entirely eliminated in many cases. The resellers that will suffer the least are those with an all-business customer base, with mostly resold Wats in their networks, with national versus regional calling patterns and with the expertise to perform end-to-end private-line support.

Perhaps the rates AT&T and the Bell operating companies file for intrastate communications will be even more significant. Resellers such as U.S. Telephone generate 40% or more of their revenue from intrastate communications. In this case, the news could be even worse for resellers — significant Wats rate increases relative to MTS and carrier access charges similar to those for interstate access. What conclusion can be drawn? Rough times are ahead for resellers, although niches still exist for those that can live on very slim margins.

Of course, all of this discussion is moot if our senators and representatives decide that it is time to put their footprints on the face of the industry. Communications legislation passed by the House of Representatives would eliminate the residential access charge and maintain Enfia rates until equal access is implemented. Such a move would wipe out the decrease in AT&T's MTS and Wats rates, and perhaps even force a small rate increase. In addition, the drastic increase of resellers' local access fees would develop only with equal access implementation.

In short, resellers will greatly benefit if current legislation becomes law. While the long-term success will still depend on building facilities, resellers could have a financial respite. For resellers, which were born and will perish from regulatory changes, the most critical question now is: What will the Senate and the President do?■

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TRAFFICKING IN CELLULAR RADIO TECHNOLOGY

BY GARY W. OZANICH

The next time you rent a car in Chicago, you have the option of conducting a business meeting from the middle of a freeway. The Chicago Metropolitan Statistical Area (MSA) has the first cellular radio telephone service, and the major car rental companies are among the first to install cellular phones or transceivers in a limited number of their luxury cars. Cellular radio provides mobile telephone service that is virtually indistinguishable from land-line service and is interconnected with the wire network.

Few technologies have been introduced with the fanfare and expectations that have accompanied cellular radio. This service will be available in most of the 30 largest MSAs within the next two years, and, depending on regulatory issues and the technology's success, most other areas of the U.S. should have cellular service by 1987 or 1988.

Whether the current enthusiasm for cellular technology is warranted is a difficult question. Cellular radio's most ardent backers talk of a future with cellular wrist-phones and briefcase telephones or of cellular as the ultimate bypass technology. Skeptics argue that cost considerations and competition from other forms of mobile communications will mean that the service will only be used by business executives in limited applications.

It is complicated to provide a realistic view of cellular radio because of numerous areas of uncertainty. It is necessary to consider the technology itself, state and federal regulations, cost and demand, competing technologies and rural vs. urban applications.

Cellular mobile radio is designed ▶

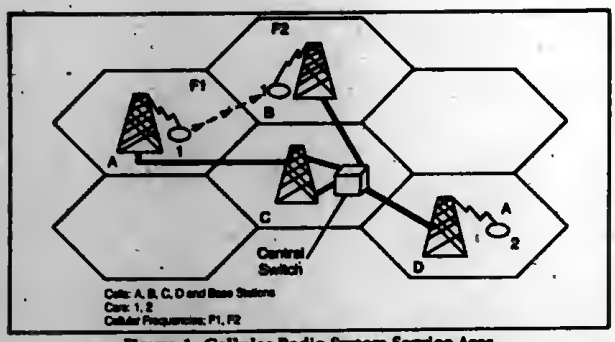

Figure 1. Cellular Radio System Service Area

to replace Improved Mobile Telephone Service (IMTS). IMTS uses 44 VHF radio channels to interconnect wireless mobile telephones with wireline telephone service. Wireline companies include the Bell operating companies and any independent telephone operating companies. IMTS uses an omnidirectional signal to service an area with a radius of up to 75 miles. It is fraught with problems such as high cost, signal degradation and limited capacity.

The issue of limited capacity is significant. With a limited number of frequencies being used to cover a wide area, there are severe constraints on the number of calls an IMTS service is able to handle. For example, New York Telephone's IMTS service for the metropolitan New York area can handle a maximum of 23 calls simultaneously. Thus, IMTS users experience long waits for open lines.

Cellular radio provides a solution to the capacity problem through a frequency reuse scheme. As shown in Figure 1, a cellular radio system divides a service area into several smaller cells. In actual implementation, the cells do not have the hexagonal shape shown in Figure 1. Each cell site contains a base station, consisting of low-power transmitters, receivers and control equipment. Each base station transmits only within its cell on preassigned frequencies. Spectrum management is achieved because the same frequencies are used by nonadjacent cells.

The base stations are connected to a central switching office. This switching office routes and tracks the cellular traffic. If a cellular phone is being used in a moving automobile, the signal is handed off from one cell to the next through the use of this centralized switch.

Cellular radio uses 40 MHz of spectrum (formerly used for UHF television channels 70 to 83) for service. These provide for a total of 666 channels, some of which are used for control circuits. The capacity of the system is technically unlimited: Cells may be subdivided into smaller cells while the power of transmission is decreased.

The number of cells in a particular service area will vary depending on use. Typically, a large metropolitan area will have from 12 to 18 cells, while a rural community may only have one or two cells. This variable cell size provides system operators with the opportunity to manage the cost of system operation by matching system size with demand.

The telephones vary somewhat in design, price and enhanced features, but their technical specifications are standard. Technically, there are two classes of phones: mobile phones, which are physically attached to an automobile; and portable phones, which have an internal power source and antenna. The portable units are extremely streamlined and include phones that can fit in the inside pocket of a suit coat.

In Chicago, the purchase price of a cellular phone is $2,600. A phone may be leased for $110 per month, including a buy-out option for $300 in 36 months. In addition, there is an installation fee of $200. Besides these costs, subscribers pay a monthly flat charge of $50, and an air time charge of 40 cents per minute from 7 a.m. to 7 p.m. and 24 cents per minute from 7 p.m. to 7 a.m. In all, cellular service costs roughly $12 to $15 per business day. In the intermediate term, costs will vary based on hardware pricing, system pay-back and tariffing.

Cellular radio is licensed by the Federal Communications Commission (FCC), with tariffing involving both federal and state policies. The FCC has been investigating the possiblity of cellular radio since 1968. In 1971, Bell Laboratories detailed the technical aspects of cellular radio in an FCC filing. In 1977, two test systems, one in Chicago and one in the Baltimore and Washington, D.C. area, were authorized. In April 1981, the FCC established a nationwide allocation scheme for cellular radio systems.

In developing this licensing scheme, the FCC did not expect cellular radio to become the investment gold rush of the '80s. Each MSA, known as a Cellular Geographic Service Area (CGSA), will have two 20-MHz cellular sytems. One license is reserved for a local wireline company — for example, the local telephone company. The second will go to a non-wireline company. The wireline company is mandated to provide the non-wireline company with equal access to the local telephone exchange. In addition, each of these systems are mandated to provide access to resellers. These resellers will market their own hardware and service.

The FCC has already accepted applications for the 90 largest MSAs. Figure 2 summarizes the number of applicants for both wireline and non-wireline licenses. The reason that there are more applicants in markets 31 to 90 than in markets 1 to 30 is related to the staggered license schedule established by the FCC. The applications for the larger markets were accepted first, and the gold rush mentality has resulted in more applicants for subsequent markets.

The number of applicants for the licenses has resulted in a serious threat to expediting service and providing a competitive environment. In allocating the license, the FCC is faced with holding a full comparative hearing for

Markets	Wireline	Non-Wireline	Total
1 to 30	52	142	194
31 to 60	70	330	400
61 to 90	83	484	567
Total	205	956	1,161

Figure 2. Number of Applicants for Licenses

each market. With this procedure, all applications must be scrutinized in a formal adjudication with the license ideally going to the most suitable applicant. This process is costly, both in time and dollars.

The FCC's response to the overwhelming number of applicants for the 90 largest markets is to encourage joint ventures — termed settlements — between the applicants. Since there are relatively few telephone companies in each MSA, there are far fewer wireline applicants than non-wireline. As a result, in most situations, the wireline companies will be granted a construction permit and operating license before the non-wireline companies because of their mutual interdependence and alleged ability to settle on joint ventures quickly. This is known as the head-start problem of cellular service.

The economic effects of a wireline head start are still being hotly debated. It has been argued by some that, with limited demand at current prices, wireline companies will garner most of the available business.

This complicated issue involves not only the length of the head start but also pricing considerations and the role of resellers. One impact of a threatened head start is a result sought by the FCC: Non-wirelines are quickly negotiating settlements.

As indicated, markets 31 to 90 have far more applicants than markets 1 to 30. This severely impacts the ability to establish joint ventures. In these markets, the only approach appears to be hard-driving litigation to chase out unqualified applicants followed by settlements by remaining applicants.

On March 1, 1984, the FCC will begin accepting applications for markets 90 and beyond. This date could still be delayed. A tremendous influx of applicants is anticipated. On Oct. 6, 1983, the FCC announced that it was seeking comments on a proposal to allocate these licenses using a lottery as opposed to full comparative hearings. This has created an uproar among some applicants and their legal representatives.

An analysis of the FCC announcement suggests that the FCC is exploring the use of a lottery for three reasons: to expedite the introduction of service in the face of a tremendous number of applications, to force applicants to think twice about submitting a license due to risk and to force settlements among the applicants. This announcement can also have a detrimental effect on the licensing process, as it may attract some less qualified applicants willing to take a chance in a cellular casino.

If the FCC does move to a lottery, there is a significant probability of a court reversal upon appeal. The treatment of all applicants as equals is likely to be considered an arbitrary decision by some because it allows the smallest, most ill-prepared companies to share an equal footing with the largest and best prepared firms.

The FCC is exploring the use of a lottery for three reasons: to expedite the introduction of service in the face of a tremendous number of applications, to force applicants to think twice about submitting a license due to risk and to force settlements among the applicants.

A final regulatory issue is state regulation. After the AT&T divestiture, cellular radio will be offered by the regional Bell operating companies. As currently configured, cellular rates will be set at the state level, but some tariffing will also involve federal policy.

Following the Bell breakup, state regulators will be under significant pressure to find new revenue sources to subsidize residential telephone service. Cellular radio seems a likely target, as it is viewed as an enhanced service and will primarily be used for business purposes. Some analysts have predicted that cellular radio service will be tariffed to provide subsidy revenues. This would likely occur through the interconnect charges into the local loop.

At the federal level, there is significant debate about how cellular fits into the access charge scheme. As current policy is read, cellular may be subject to the same access charge as long-distance carriers such as MCI Communications Corp. and GTE Sprint Communications.

Year	New Subscribers	Total Subscribers	Growth Percentage	Monthly Subscription Cost	Yearly Revenues (Millions)	Growth Percentage
1984	16,000	16,000	—	$155	$ 27.9	—
1985	75,000	90,000	500%	$150	$ 162	481%
1986	120,000	210,000	133%	$125	$ 315	94%
1987	230,000	440,000	110%	$100	$ 528	68%
1988	270,000	710,000	61%	$ 85	$ 724	37%
1989	310,000	1,020,000	44%	$ 75	$ 918	27%
1990	340,000	1,360,000	33%	$ 70	$1,142	24%

Source: Link Resources

Figure 3. Cellular Radio Market Forecast

It is difficult to estimate the demand for cellular radio. Many industry analysts and license applicants have been excessively optimistic about the demand for service. The demand for cellular radio is extremely price-sensitive. Since cellular radio costs about $65 to $75 per month, there is virtually no nonbusiness user demand. Considering current prices, cellular radio will attract revenues only from business users.

A crucial element of this price is the telephone itself. The current transceiver cost of $2,600 will drop substantially and rapidly to a price of about $700 to $900. A price of $500 is definitely possible during the next few years. Yet, the high costs of system construction and interconnection will keep cellular radio priced at a premium for the next several years. Figure 3 illustrates Link Resources Corp.'s cellular radio forecast and anticipates price points during this decade.

Even if the price of cellular service does decrease, how profitable will it be? There are two major issues: First, resellers will exert downward pressure on margins. In Chicago, a reseller can lease 100 lines (numbers) from Ameritech Mobile Communications, Inc. for $42.50 per line per month — a $7.50 discount — and receive a 2% discount on air time. The reseller can price the service in any way desirable. As a result, a reseller can potentially import less expensive hardware and put together a lower cost package than a system operator. This will keep downward pressure on prices.

Second, the mobile delivery of voice service does not have sufficient dimensions for product differentiation. It will be difficult to compete on grounds other than price.

As discussed so far, cellular radio has been considered as a product complement to wireline service, a mobile delivery mechanism for voice services. In this mobile delivery arena, cellular radio will meet with a very tough competitor — paging services.

Paging services have been an explosive growth area. The variety of services include tone, voice, numeric and alphanumeric pagers. The FCC is in the process of licensing national paging services to provide for the interconnection of local paging companies.

There are currently about 2.2 million pagers in service. The cost of a pager depends on the type of service, but some types cost below $100 per pager.

In the paging industry, innovation has been impressive. Pagers capable of receiving up to 1,000 alphanumeric characters have been introduced recently. Furthermore, the inclusion of printing capabilities in alphanumeric pagers is anticipated. It may be argued that pagers, particularly alphanumeric ones, are attractive substitutes for cellular services. Much business communications is intrafirm, and paging may be considered both technologically and economically superior to cellular radio in many of these applications.

It is necessary to make one final point regarding the competition of cellular and paging: Cellular radio is an analog technology in an increasingly digital world. For example, alphanumeric pagers will be used as terminals for electronic mail, while cellular radio remains a voice-only service — or at best a potential connection for a modem. It is possible that future generations of cellular telephones will have built-in modems and associated digital communications capability. Currently, however, cellular radio is almost exclusively viewed as a product extension of existing wireline voice services.

Telephone services in rural areas present unique problems. The cost of constructing and installing capital equipment and providing service in thinly populated areas is extremely expensive. Given the AT&T divestiture, the lack of a significant population base over which to amortize costs may be an even greater problem. This breakup parallels telecommunications deregulation that is designed to price goods and services at cost as well as to instigate technological

progressiveness. In this environment, rural areas will lose some cross-subsidies, and in most areas, standard telephone rates will increase substantially.

The cellular radio technology could provide a relatively low-cost means of providing rural telephone service. A one- or two-cell system may be lower in cost than a wireline network. However, the current price of the cellular telephone still makes the technology an unsuitable substitute for wireline service. As the price of cellular hardware decreases, a unique opportunity for this wireless service may exist in rural markets as a bypass technology.

THERE IS NO QUESTION that cellular radio is a technology of significant utility that will be highly visible in the '80s. It is being introduced into a highly uncertain marketplace, both relative to regulation and economics. During the next several years, the price of cellular radio will limit demand almost exclusively to business users. A rule of thumb would suggest a penetration rate of roughly 1% to 1.5% of the population in the major MSAs during the late '80s. The penetration of cellular radio is difficult to predict in smaller markets, as use is highly correlated to commuting time, as well as industrial development.

The technology itself is highly robust, having the ability to provide unlimited capacity. The cost of the cellular transceivers is likely to fall. The most optimistic cellular analysts see $20 Talkmen wrist-phones. This is theoretically possible, but a context is required to view the future of the cellular industry. This context is one of regulation, interconnection charges and competition. Cellular radio is likely to provide a good return on investment to reasonable system operators who try to be low-cost providers of service through efficient operation. ■

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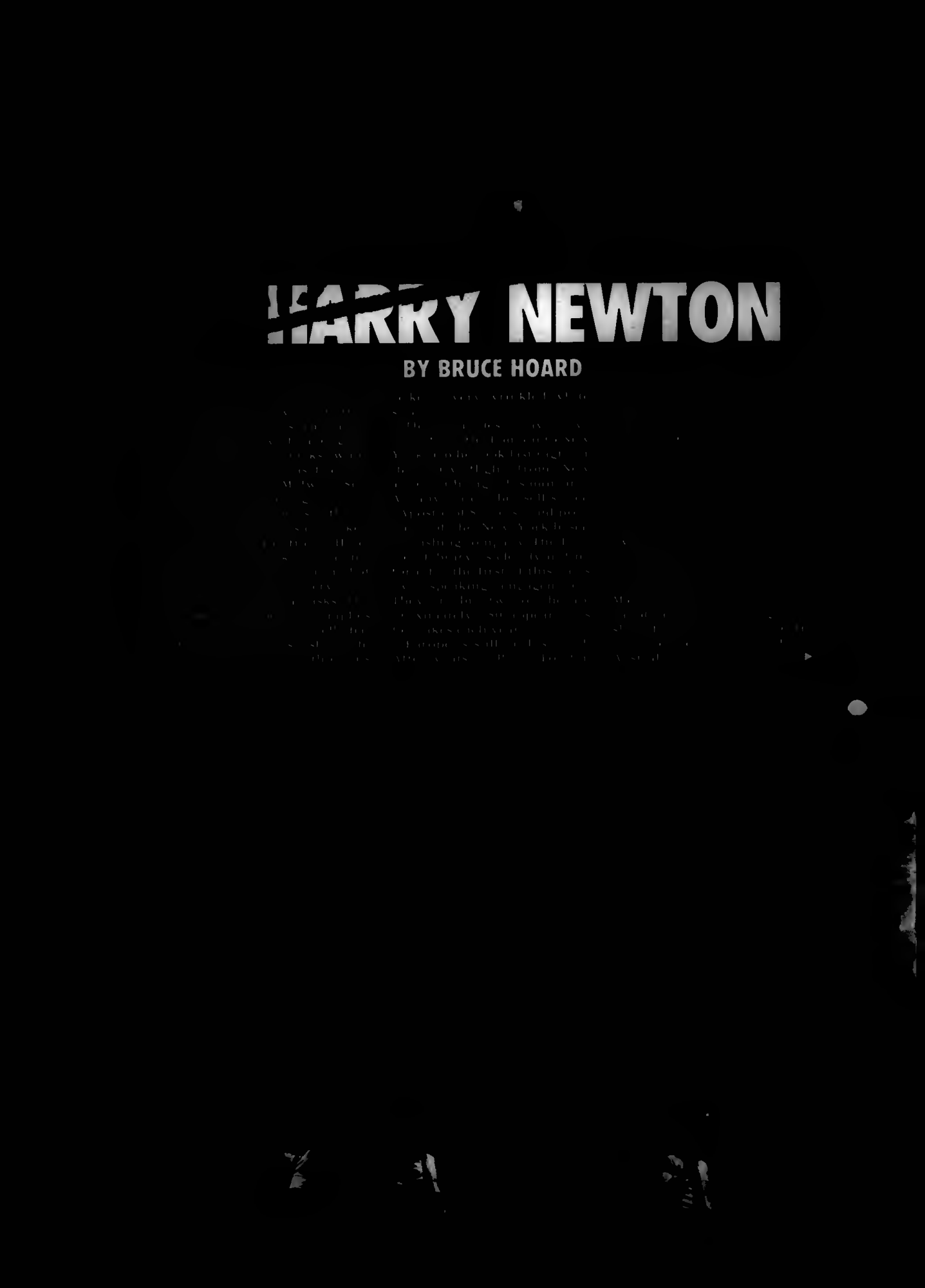
HARRY NEWTON

BY BRUCE HOARD



HARRY NEWTON

"Can I bum a smoke?" he asks a woman. He decides they will share an ashtray on the empty seat next to her. "Sharing an ashtray is like time division multiplexing," he notes. With Harry, telecommunications is a metaphor for life.

The primary objective of Harry's European trip was the Telecom '83 conference in Geneva, and he recalls his experiences there with enthusiasm. AT&T spent $12 million on its booth, he says, pacing up and down the aisle. The Russians spent $5 million on theirs. "And the Bulgarians have the best coin telephones in the world."

"Can I bum a smoke?" he asks a woman in the third row. Abashed, she hands him a cigarette. He decides they will share an ashtray on the empty seat next to her. "Sharing an ashtray is like time division multiplexing," he notes. With Harry, telecommunications is a metaphor for life. Tilting his head back and blowing smoke out his nose like a locomotive, he gets back into Europe and coin telephones. The Louvre has lots of paintings, but no coin telephones. He claims to have rented a telephone book in Paris. "Now I know why they want to replace their telephone books — there aren't any," he declares.

He makes more declarations: Videotex is good for "such useful things as getting the weather in northern Scotland." The West German government only allows TV between 4 p.m. and 11 p.m. Geneva pay toilets flush automatically when you stand up and break an electronic beam. On and on. Rapid fire. Harry in Europe.

His gray hair tousled, he pauses and twists, switching gears. "Let's talk about the industry. Where we're going is incredible."

But then, abruptly back to Europe. He tried to hook the modem in his 1,200 bit/sec Radio Shack TRS-80 to a telephone line. No luck. Next memory: John deButts, the former chairman of AT&T, is now running European Postal Telephone and Telegraphs, the European equivalents of the U.S. Federal Communications Commission. "John deButts doesn't believe in competition — nothing," Harry claims.

Finally, Europe is left behind. "Let's talk about the U.S.," he says, sliding into his "Apostle of Success" role. "This is the right time to be in this business. The opportunities we face in the U.S. today are incredible." Harry, a native Australian turned American citizen, speaks with the zeal of a convert.

His voice takes on a serious tone as he deplores the downtrodden state of communications managers, many of whom are in his audience. There is a palpable mood change as he empathizes with their problems. "You can become entrepreneurs while working for someone else," he says. He mentions two users within large organizations that are making $300,000 in yearly salaries. The message is clear: If they can do it, so can you.

Harry believes that by the end of the decade, there will be an American trillionare, and that person may just come out of the telecommunications industry. "If he can make a trillion, you people can make a few thousand or a few million," he says.

At the age of 41, he has certainly been successful, but refuses to divulge whether he's cracked the million mark. One thing can be said with absolute certainty: When a person

commands $12,500 for a two-day seminar, as Harry did on his London stopover, he is certainly riding the upside of the wealth curve.

Winding down, he is asked, "What qualifies you to be a telecommunications speaker?"

"Heavy self-promotion."

HIS FULL NAME IS Harry Newton. Period. And on the 30-mile ride into Chicago after lunch, he talks about where he comes from and what he does. He was born in Sydney, Australia in 1941. He lived there for 26 years. He earned economics and accounting degrees at Sydney University before migrating to the U.S. in 1967. He received an M.B.A. from Harvard Business School in the summer of 1969 and has lived in the U.S. ever since. His wife's name is Susan, and he has two children, Claire Elizabeth, who is 3½, and Michael Allen, who is 1½.

He founded his company, The Telecom Library, in 1972. He is president, and the firm publishes and distributes books (among them *The Magic of Becoming Successful* by Harry Newton), conducts seminars and offers consulting services. He is enthusiastic about *Teleconnect*, which was started last March. *Teleconnect* is not your average trade publication. Harry's inimitable touch — and byline — is everywhere. When you get right down to it, it is a Harry Newton tour de force.

In fact, sometimes Teleconnect resembles *Mad Magazine* more than a serious business publication. For instance, an item in last Noyember's edition asked the question "Intel And Hershey To Merge?" And the answer? "Yes, they're merging to produce a 256K chocolate chip."

What kind of person would do these crazy things? He pauses when asked to define himself, looking out of the car window. At last, he has it. "I'd say I'm a high-tech telecommunicstions intellectual handyman."

This somewhat unwieldy sobriquet is soon followed by another, more lyrical one: "I would call myself an apostle of success."

It might be more appropriate to duh him an apostle/salesman, because his conversation is frequently punctuated with references to sales and marketing. You have to sell yourself, sell your ideas, sell your company. Harry tells a good story about the "self-immolation close," a somewhat apocryphal sales technique whereby a rookie salesman is told he must douse himself with gasoline and threaten to light up if the potential customer does not agree to buy.

Every occupational group should have a Harry Newton. Harry is the patron saint of telecommunications, the exemplar of what can be. He addresses his audience members as if they were family, chiding them and urging them to realize their potential. He really cares for them, but at the same time, he sees their weaknesses. He describes the typical telecommunications professional as "very conservative, unsure of his skills, a little insecure, lacking in formal and informal education and bruised because he is beaten up on by his bosses.

"I feel sorry for them, they're my people, I've known them for years." He says all this slowly, painfully and with compassion.

So how does this flamboyant, cocksure, Harvard-educated company president fit in with these people? He is asked if, when he speaks to them, he feels like the hometown boy that went away to success, only to return and find his friends still toiling at the local mill, locked into a lifestyle that will never change.

"So you see that too?" he replies as the car speeds along.

But Harry doesn't really believe that any of them are locked into

anything of the sort. He believes the magic of becoming successful can touch them as it has touched him, and he pounds that message home. "It's a thankless job, and they haven't learned how to make it thankful," he says.

He cites IBM as an example of excellence, saying that company builds confidence in its users, wants them to be stronger so they'll know more and buy more. He puts AT&T at the other end of the spectrum, speaking of it with open contempt. AT&T used to be an exemplar also, a leader the industry could look up to, a good company to work for. Now he sees it as a tawdry caricature of its once-proud self. If it was up to Harry to redesign the AT&T logo, he would probably have kept the

bell but put a huge crack in it.

The car is pulling into the catacomb-like parking lot under Chicago's McCormick Place, the site of his second speech this day. He mounts the steps to the exhibition floor of the Intech '83 conference, where he plans to make a whirlwind inspection before speaking. He's forgotten just what it was he is supposed to speak on so he asks. The official topic is "How to Advance Your Career by Embracing Office High Technology." The actual presentation may cover anything.

Up on the floor, he commences the inspection. He is an entertaining guide, a raconteur with nonstop commentary. This company lacks direction; this one knows where it's going. That one used to. This one never will.

Ah, the AT&T booth. It's time for a little fun. Harry wants a hands-on demonstration; Harry wants to play. This request is met with frozen smiles. They know Harry at the AT&T booth. They're sorry but nobody is allowed to touch the equipment. Won't he let them show him how it works?

No. Harry wants to do it.

"I think we're not welcome here," he says offhandedly.

Not so, they assure him with now very thin, glacial smiles.

There is tension in the air. Will Harry attempt to play with the equipment anyway? Will he have to be forcibly restrained? Will the relative calm of the exhibition floor be broken by a stampede of beefy, whistle-blowing security guards? Will Harry lurch in the grip of a militant AT&T sales representative, kicking over tables, sending thousands of dollars worth of sophisticated equipment tumbling to destruction? The moment is upon us.

And Harry defuses it. Pointing to a terminal that strongly resembles a radar range, he observes, "This, by the way, was designed by a subsidiary of Amana Ovens." It is a funny comment, but the AT&T folks aren't laughing. Time to move on.

Five minutes later, he is greeted by a silent, dispersed audience of 10 people when he enters the posh, red-velvety Playhouse Theatre. "This is going to be the most expensive per capita speech in history," he mutters, taking the stage. But this audience will get the same treatment the $12,500 crowd got in London. Addressing the sparse audience, he says, "This is like somebody announced a war and nobody came." The audience laughs. He's got them already.

Eschewing the podium, he bums another cigarette and is off again. During this second talk of the day, he rolls off many of the same humorous aphorisms and anecdotes that marked his morning speech, but he's got plenty of fresh material. He talks of hospital operating expenses, jokes about Nancy Reagan, makes predictions for the future.

When, after the full hour-and-a-half, this speech too is done, he stays to pass out catalogues and sell autographed books at $5 each. Still talking as he autographs one, he declares, "This signature will be worth something if I get hit by a bus on the way out of here." ■

Hoard is editor of Computerworld On Communications.

Special Section

GEOPOLITICAL STRATEGIES

By Brian Jeffrey

While the face-off between IBM and AT&T in the U.S. market seems to be developing into coalition warfare, a similar process seems to be starting in international markets, with the added complication that it involves not merely private companies but national Postal Telephone and Telegraphs (PTTs) and national governments.

But the world's two largest electronics companies cannot initiate aggressive strategies calling for a major expansion of overseas business in the politically sensitive telecommunications field ▶

without significant repercussions.

AT&T and IBM are both targeting international telecommunications markets, albeit from slightly different priorities. AT&T's main concern seems to be expanding its existing lines of business into international markets. IBM is looking to make the same kind of sideways move out of the computer business into communications abroad that it is attempting in the U.S.

The problem facing both companies, however, is that telecommunications remains a regulated business in virtually all the major overseas markets. Despite some liberalization over the last few years, transmission infrastructures are still typically controlled by national PTTs. In addition, the equipment business is dominated by a handful of favored national suppliers. They are Nippon Electric Co. (NEC), Fujitsu Ltd. and Hitachi Ltd. in Japan; the CGE Group and Thomson-CSF in France; Plessey, Inc. and General Electric Co. Ltd. in the UK; Siemens Corp. and AEG in Germany; Northern Telecom, Inc. in Canada; Italtel in Italy; Ericssen in Sweden; and Philips in the Netherlands.

The few companies without a strong national base — ITT and, to a lesser extent, Philips and Ericsen — have relied heavily on relationships with national subsidiaries with extensive local manufacturing and development activities. Thus, they too claim to be national suppliers. In particular, ITT has remained in the politically sensitive business of supplying the PTTs in many countries because of its highly decentralized approach. This approach is aimed at reassuring governments that they will not surrender any control over their national telecommunications industries by awarding business to a foreign company.

Until recently, IBM and AT&T did not desire to meddle in the patchwork of national jurisdictions governing the international telecommunications market and the political bargaining that goes with it. AT&T pulled out of the international telecommunications business in 1925, when it sold its operations outside North America to ITT. According to AT&T, the deal was made to enable the firm to focus better on its North American business. According to others, it was part of a deal with ITT to stay out of each others' markets. AT&T did not begin to get back into the international scene until the mid-'70s when, apparently in response to State Department prodding, it began to compete for some of the big telecommunications contracts put out by the developing countries.

While it was solidly entrenched in the computer markets of most of the major overseas countries, IBM did not make much of an effort to enter the international telecommunications market. It entered the computer services and private branch exchange (PBX) business in Europe, but was not a major player. The company's activities were low-key for several reasons: a lackluster product, the Carnation PBX, developed at La Gaude, which is generally regarded as one of IBM's worst research and development facilities; weak marketing; and the knowledge that the European PTTs and their favored suppliers would resist IBM's attempts to enter the market.

Moreover, the pressure of the U.S. antitrust suit, in which IBM's communications activities in Europe were cited, appears to have led to a deliberate de-emphasis on this area. IBM let it stagnate.

Both companies began to pay more attention in the late '70s, but for different reasons. For AT&T, the renewed emphasis on international sales was due to impending divestiture and a recognition that it needed to motivate itself in order to compete. A new subsidiary, AT&T International, was formed in 1980 to "satisfy international customers' information systems needs with profitable applications of AT&T technology, products and skills, providing

quality service through a coordinated, long-term presence," according to an AT&T spokesman.

AT&T recognized that it was going to end up competing across-the-board in the new information processing market in the U.S. But the primary emphasis of AT&T's international push was — and still is — on reestablishing itself as a major market player for big telecommunications procurements by PTTs.

By early December 1985, AT&T had landed a series of major international contracts. These include a microwave system, central office exchanges, PBXs and other equipment in Saudi Arabia; in Greece, a submarine cable linking the country with Egypt; central office exchanges in Korea; a microwave system in Ireland; in Taiwan, central office exchanges and cable linking the country with Guam; and central office exchanges in Egypt. AT&T was actively pursuing others. It had also formed a joint venture with the Dutch electronics giant Philips to market AT&T central office exchange systems in Europe, the Middle East, Africa, Latin America and in parts of Asia.

IBM's priorities have proven to be very different. Although not a competitor in the business of big ticket sales to PTTs, IBM had good reason to pay attention to them. After a long dormancy, the European PTTs and their Japanese counterpart, Nippon Telegraph and Telephone Corp. (NTT), began to show surprising signs of life in the late '70s. The British Post Office's Prestel videotex system also went public in 1979.

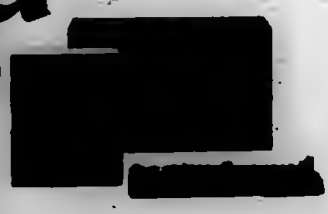
France, a little slower off the mark, responded with a series of programs revolving around the concept of Telematique — derived from telecommunications and informatique, the French term for data processing. This ambitious program was designed to develop a nationwide videotex network via the French PTT and was accompanied by a range of other projects supported by French authorities and covering many areas.

The Japanese countered with a series of programs covering areas such as mass facsimile and data base services. That program culminated in the Information Network System (INS), an ambitious long-range plan to integrate the new range of services into a common system based on a nationwide fiber-optic cable infrastructure. In addition, the Canadians got into the act with their Telidon videotex program.

IN RETROSPECT, the enthusiasm generated by these programs seems a little exaggerated. Videotex in particular proved to lack the commercial charms attributed to it. But the programs delivered a salutary shot in the arm to IBM. After years of suffering hostility from many host governments determined to promote their own computer industries and the assaults of their various national contenders, IBM finally seemed in a good position to do business.

Computer companies like International Computers Ltd. in the UK, CII-Honeywell-Bull in France, Siemens in Germany and Fujitsu, Hitachi and NEC proved to be a manageable threat. In fact, none of them would have survived against IBM in the computer market without large-scale government support and preference.

However, the new telecommunications programs posed another serious threat to IBM. The forthcoming merger of computer and communications technologies put the Europeans and Japanese back in contention. Using their control of the PTTs, governments could accord a preference to their national suppliers in the new markets far more effectively than had been the case in the computer industry. The result, as IBM rapidly recognized, was that IBM could easily be excluded from the communications systems and services areas that it had identified as primary engines of growth in



the '80s. And there was nothing IBM could do about it.

The situation changed radically and agreeably for IBM from 1979 to 1981. The conservative government elected in the UK in 1979 favored deregulation of the telecommunications market and reduced state intervention. The following year, the Reagan administration came into power in the U.S. and revealed its intentions to take a strong line against Japanese protectionism. In Japan, the Nakasone administration proved receptive to the U.S. attitude; plans were made to make NTT a private company.

In France, the election of Francois Mitterand as president in 1981 brought in an administration that lacked its predecessors' enthusiasm for Telematique. It was receptive to IBM's arguments about its employment and R&D activities in France and its positive contribution to the French balance of payments. Even in Germany, where IBM had begun to face serious discrimination in favor of Siemens for public-sector purchases, divisions in the left-center government allowed the company better access to the German telecommunications market. In 1982, a more pro-American and antiprotectionist regime was elected.

All this represented a fairly radical reversal of IBM's fortunes. In all of the major overseas markets, IBM was faced with new opportunities, and it seized them. In November 1981, it landed a $22.5-million contract from the West German PTT to supply Series/1 and 4300-based controllers for the national videotex system. It also set about entering videotex markets elsewhere in Europe. In Japan, a combination of political pressure and the self-interest of Japanese companies allowed IBM to put together a formidable coalition of partners: Mitsubishi Corp., Japan's largest trading company, and Matsushita Electric, Japan's largest consumer elecronics manufacturer. They joined a number of smaller companies as IBM partners targeting the new markets created by the INS program. In October 1983, IBM agreed to cooperate with NTT in the development of large-scale networking systems.

By early December 1983, IBM had brought about a major change in the competitive dynamics of the Japanese information processing market. Not only had it become an integral player in the INS program, it had also put together a formidable coalition of partners that looked hard to beat. More recently, the focus has shifted back to Europe, where IBM is looking for the same kind of substantial links it formed in Japan. It has been talking to a number of European groups about cooperating in telecommunications.

IBM's goal seems to be to establish itself as an integral player in other countries as it has in Japan. It plans to use cooperative agreements with PTTs and major telecommunications companies. Its attempts have been far-reaching. National aerospace companies have been approached, and there has been talk of IBM participating in various cooperative development projects and programs for the commercialization of products and technologies developed by small firms and academic institutions.

AT&T, like all companies in the big-ticket telecommunications business, has experience in horse-trading with governments. In Korea, AT&T used Western Electric to put the Lucky-Goldstar Group in the semiconductor business. It set up a joint venture with the Taiwan government to produce exchanges.

DESPITE ITS focus on the big-ticket market, AT&T is clearly looking for the same kind of partners as IBM — PTTs or private firms with an embedded presence in national telecommunications markets, good conventional and electronic distribution capabilities and political leverage with their host governments. AT&T is currently focusing on markets outside the mainstream, where competition from other international competitors is relatively weak. Its Dimension PBXs, for example, are sold via partners in Australia, Greece and Hong Kong and directly by AT&T International in other parts of Asia. The strategy of starting in the less developed, less competitive peripheral markets is similar to the way in which successive Japanese industries have begun their moves into world markets.

This is unlikely to last for long. After trial runs in the smaller markets, AT&T is likely to offer the same kind of trade-offs to the governments of larger countries trying to promote a national information processing industry with weak competitors and limited budgets. There are quite a few governments that fit that description. Prime candidates are the UK, Germany, Italy, Spain, Australia and Israel.

Despite claims to the contrary from both companies, IBM and AT&T are likely to start competing heavily in international markets in the near future, although in a different form than expected. They will compete for local partners, market access and political leverage.

This kind of competition, of course, is not new to the information processing industry. Most of the major players in both the computer and telecommunications business have played the game at one time or another. What is new, however, is that the world's two largest and most powerful electronics companies are starting to do it on a large scale.

At the moment, IBM looks stronger. With worldwide leadership in the computer industry and an embedded market presence in virtually all of the major single-country markets, it has more to offer its partners. Yet AT&T has some potent cards to play. Starting from a weaker position than IBM, it has been far more ready to transfer technologies and, under the right conditions, to accept local control of joint operations.

AT&T has also shown its willingness to provide support for local partners across a range of technologies. Central exchange, processor and semiconductor technologies, for example, all went to the Lucky-Goldstar Group. With Western Electric re-emerging as a force in the merchant semiconductor industry, tie-ups in this field may prove particularly attractive to overseas governments. Moreover, unlike IBM, AT&T has no existing market presence in the major international markets to protect and thus has less incentive to impose limitations on its local partners.

Looked at in that perspective, IBM looks less attractive as a partner. It has scarcely shown itself amenable to government-sponsored national information processing industries in the past. Its desire to retain control over its technologies is strong. It pulled out of the market in India altogether rather that accept a majority ownership of its subsidiary by Indians. Recently, it has also been aggressive against those infringing on its patents.

A remote AT&T offering a cornucopia of technologies, management and technical assistance and more substantial forms of support can look very attractive compared with an aggressive, proprietary IBM controlling a large chunk of the national computer market.

All of this opens up some interesting possibilities. A single major tie-up such as AT&T with Olivetti or IBM with British Aerospace — both of which have been seriously considered — could change the competitive position rapidly. Another possibility would be for IBM or AT&T to strike a deal with a national company, prompting that company's competitors to rush out and link up with the other American firm as a counterweight. This appears to be occurring already in Japan, where the formation of the IBM-Mitsubishi Group has triggered moves by Mitsui, Japan's second largest trading company, and Sony, Japan's second largest consumer electronics vendor, to bring AT&T into the Japanese market.

Alternatively, there is the possibility that escalation will occur as both companies seek to preempt the other. Both, for example, are looking at British Telecom, which has been turned into a private company, and NTT, which is in the same process, as potential distributors and joint-venture partners. And IBM has landed a contract with British Telecom to supply Series/1-based systems designed to enhance existing central exchanges. The contract, worth $7.1 million, involves hardware and software that provides some of the functionality of British Telecom's System X digital exchange for existing equipment. It is a stopgap measure until System Xs are available later in the decade.

Like the German PTT contract, it is small in dollar terms but a danger signal from AT&T's point of view. The central office exchange business is, after all, an important area to AT&T and not the sort of thing that IBM was expected to become involved with.

In short, there are quite a few wild cards out, and if IBM or AT&T starts playing them, there could be large-scale international competition between them sooner than is generally expected. Over the last few years, both companies have shown an increasing willingness to play these wild cards. Global competition, like global war, may prove to have its own dynamics. Once started, it is not clear that the timetable can be controlled by either party.

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special section

U.S. AFFILIATIONS

By Alain Desrenne

A few years ago, when it first became clear that AT&T and IBM were likely to be released from their respective legal restrictions, there was a lot of speculation about the impending face-off between the two firms. It is surprising how much of the speculation was wrong. Certainly, there was some detailed analysis, but the largest failing was simply in imagination. Most analysts seem to have assumed that while both companies would become more aggressive and competitive, they would nevertheless follow the same behavior patterns as always.

And that, it rapidly transpired, was not the case at all. IBM and AT&T upset calculations about their strengths in products and technologies by going outside the company on a large scale. ▶

U.S. AFFILIATIONS

IBM started the ball rolling in July 1983 with its agreement with Mitel, Inc. for joint development of networking systems based on Mitel's SX-2000 private branch exchange (PBX). It followed up with similar agreements with Texas Instruments, Inc. for development of very large-scale integrated interfaces for its local-area network line and with Motorola, Inc. for a proprietary IBM cellular radio system.

In addition, Satellite Business Systems (SBS), the satellite communications firm in which IBM has a one-third share, filed with the Federal Communications Commission (FCC) in February 1983 for removal of the restrictions on its relationship with IBM. These restrictions were imposed as a condition of the company receiving an FCC license.

More visibly, IBM also bought 12% of Intel Corp. and 15% of Rolm Corp., with options with both companies to increase the holdings to 30%. IBM appears to have set about exercising these options by a string of small additional purchases.

AT&T began its moves in 1983. Agreements were announced with Coleco Industries, Inc., for an on-line games service; General Motors Corp., for a pilot mobile radio option on the latter's Buick Riviera; and with three companies — Wang Laboratories, Inc., Hewlett-Packard Co. and Bailey Controls — for joint equipment certification and the implementation of Dimension System/85 PBX interfaces. According to AT&T, similar agreements with other companies are in the works.

FOR BOTH FIRMS, THE process of forming tie-ups with other market players is far from over. Both are pursuing joint arrangements in the international telecommunications market. The list of U.S. tie-ups for both is obviously still far from complete. When it first became clear that IBM and AT&T were going to be deregulated, there was a tendency to assume that they would expand largely through in-house capabilities and the extension of existing operations. With this assumption, it was reasonable to suppose that the two would only be competing in the long term.

In reality, the competition is shaping up much faster, but in a different form. Both companies are forming tie-ups with direct competitors of the other. IBM is affiliated with Rolm, which competes directly with AT&T. In addition, AT&T is developing what will probably be a substantial relationship with Wang, which has been fighting a head-on battle with IBM for the office automation market for some time. Also, SBS has begun an aggressive campaign aimed at the market for AT&T bypass telephone services.

It looks like it will go further. IBM has covered several key communications areas that it had identified as areas of internal weakness — Rolm for PBXs, Motorola for cellular radio, its own Information Network for computer services, in-house capabilities and outside tie-ups for local-area networks. It still lacks a substantial presence in the mainstream telecommunications services market. SBS may supply part of this, but other tie-ups are also likely. There is really no reason why IBM should not buy 15% of MCI Communications Corp., General Instruments Corp. or one of the other big firms in this field.

AT&T got a later start, partly because its divestiture case dragged through Congress and the courts. But it is catching up fast. AT&T needs to form a partnership in the mainframe area, and Amdahl Corp. and National Advanced Systems, Inc. have been considered. In addition, AT&T recognizes that it needs a presence in the micro market faster than it could develop itself. It also needs to cover factory automation. The Bailey Controls arrangement covers only the process control business, and other sectors need attention.

Moreover, AT&T will probably cover its bases in such areas as local-area network systems, mass storage and video systems through outside arrangements. It can also be expected to expand its coverage of the minicomputer field to other companies. It is likely to follow IBM's example by buying into a state-of-the-art microelectronics firm. It is still unresolved whether AT&T will put itself into the IBM-compatible business.

As each company points out, these moves should not be interpreted as a competitive assault on the other. Both firms have done their homework on potential areas of diversification, and both have decided that most of the information processing market is a lucrative target. Similarly, both companies have investigated potential distribution channels — for example, the Bell operating companies, systems houses, third-party retailers, on-line services and telemarketing. Inevitably, both firms will use the same ones. As the two diversify and form new tie-ups, they will form the center of groups of companies that are the mirror image of each other.

The speed at which this situation has developed has been surprising — not least of all to AT&T and IBM. The sudden rash of tie-ups and buy-ins has turned out to be the result of approaches from potential partners more than the result of their own plans. IBM, for example, seems to have started with fairly limited objectives in the PBX field. It was more concerned with defending its flank in the Fortune 500 market against competition from PBX vendors than entering the market. Rolm had other ideas, and Rolm management approached IBM.

Similarly, IBM did not plan to buy into Intel, although it was looking at some fairly close licensing and development arrangements. Intel, however, was distinctly short on capital at the time and lacked the resources to respond to increased demand in the semiconductor market. This point appears to have been made by Intel management to IBM management. There were also reports that the clincher was the appearance of another large company as a would-be buyer.

Similarly, SBS clearly saw the advantages of a relationship with IBM, and IBM figures prominently in the company's attempts to build market awareness of its services.

In short, the appearance of groupings of companies around IBM and AT&T is proving to be the result of a desire to be tied up with the industry giants. It is not hard to understand this. With competition heating up in many sectors of the market, an IBM or AT&T affiliation is seen by more and more companies as a means of improving prospects and keeping shareholders happy. It is hard to find an affiliate of IBM that has not proudly advertised the relationship in its annual report. The remarkably good press generated by IBM has certainly helped stimulate the process, and it is likely that the same will happen for AT&T once it begins to show its capabilities.

Whatever the immediate motives of IBM, AT&T and their partners, it is clear that they represent part of a broader, long-term structural shift in the information processing industry.

Perhaps the best way of looking at it is to consider the industry's history. For the last 30 years, there have been successive waves of new companies: mainframe manufacturers such as IBM, Burroughs Corp., Sperry Corp., NCR Corp., Control Data Corp. and Honeywell, Inc.; the plug-compatible manufacturers; minicomputer companies such as Digital Equipment Corp., Data General Corp., HP and Prime Computer, Inc.; office automation vendors such as Wang, CPT Corp., NBI, Inc. and so on; personal computer firms such as Apple Computer, Inc. and Radio Shack; and home computer firms such as Commodore Business Machines, Inc., Texas Instruments and Atari Corp. Whether it is due to the speed of technological change in the industry or to the lack of flexibility of American corporate organization, the fact is that existing market leaders have failed to react fast enough to each new technology.

A similar process can be seen on the communications side, although AT&T's presence across the spectrum confuses the picture a little. In 1968, the Carterfone Decision created the Interconnect vendors — Northern Telecom Inc., Rolm, Mitel and so on — as a presence in the U.S. market. These firms pioneered the use of digital PBX technology. Specialist companies emerged as the leading players in other technologies, such as key systems, local-area networks and cellular radio.

The history of the information processing industry has involved specialized market players that may have diversified into other areas, but whose success has been built on a single-product market complex.

This picture is starting to change, driven by the convergence of technologies and markets. With previously distinct market segments starting to merge — a development reflected on the user side by increasing coordination and occasional merging of functions such as data processing, word processing and telecommunications — it is becoming necessary to cover the bases. As a result, the specialist vendors have scrambled to add other capabilities. Computer vendors added local-area networks, PBXs and word processors; PBX vendors added local-area network interfaces and intelligent workstations; and just about everyone added gateways of one sort or another.

Apart from the standards mess that this has created, there has been a rash of teams forming to address particular markets or technologies. A situation is starting to develop in which the specialist vendors — a category that includes firms as large as DEC, Wang or Rolm — is no longer a viable competitive entity except as a member of or supplier to larger, multitechnology groupings.

After several decades in which the trend has been toward specialization, the whole process is reversing itself. More than anything else, IBM's success in the personal computer market has signalled this. After a poor performance in

minicomputers (the Series/1 was almost cancelled at one point as a complete failure) and office automation (the confusion created by the competition between Data Processing Division, General Systems Division and Office Products Division is still far from sorted out), IBM succeeded in catching the wave of micros and riding it. Moreover, it is looking at some of the new technologies — cellular radio, videotex and CATV.

AT&T is going the same way. Its immense installed base and marketing organization provide a current base of strength on which it can build in the long term through its financial resources, Bell Laboratories research and development and the manufacturing capabilities of Western Electric. The company is reasonably confident that it can catch new waves of products and technologies.

Its problem in the short term is like IBM's in PBXs: It must defend its flank against an erosion of its current position that could prejudice its long-term plans. Tie-ups with other companies provide an excellent way of achieving this. AT&T's affiliation with Wang gives it an indirect presence in the area of word processing systems. HP does the same in minicomputers.

At a time when market dynamics are pushing the information processing industry toward the formation of large, multitechnology and multimarket groupings, AT&T and IBM are emerging as the largest and most attractive poles toward which smaller, specialized vendors are gravitating.

IN THE LONG TERM, what form will these groups take? Perhaps it is too early to judge AT&T's future, but there are better indications for the IBM group. IBM is looking for substantial relationships with its key partners. A string of small additional purchases of the equity of Rolm and Intel indicate that IBM intends to take up the full 30% option on both in the not-too-distant future. It has bought into a number of other smaller firms over the last few years.

Other purchases in the 15% to 30% bracket are known to be in the works, and the company also appears to be experimenting with other ways of tying in key collaborators. For example, Xebec Systems, Inc., a firm that manufactures components for the XT, has recently indicated that it will purchase a significant amount of factory automation equipment from IBM and its value-added resellers. For a small company, its investment is substantial, which suggests that there is more to the relationship than meets the eye.

Combined with its third-party distribution activities, the grouping of companies around IBM is beginning to look like the big Japanese groups such as Mitsubishi Corp. and Mitsui & Co. Ltd. These groups are sets of companies linked by cross-shareholdings, interlocking directorships, supplier relationships and various joint marketing, development and financing tie-ups. The resulting grouping would possess the advantages of size without the inflexibility of a more rigidly structured organization.

From the initial across-the-board competition between IBM and AT&T via affiliates, it seems likely that more direct competition for systems and services will develop rapidly as the two extend their degree of control over and cooperation with the member companies of their groupings. Given the long-term trend toward the merger of markets and technologies and the increase in competitive pressure in many market segments, the dominant forces in the industry will move more increasingly toward concentration.

This raises some interesting points. While the small, entrepreneurial company should remain a viable entity for a long time, the medium-size vendors with historical strengths in a particular market may gradually disappear as they form part of larger groupings.

There are a number of historical situations in which pressures of economy of scale led to an industry shakeout. The automobile industry is a prime example. The end product of the shakeout was a handful of large companies competing directly in the market, but with a large and healthy — at least until 1979 to 1980 — sector of independent component, subsystem and specialty suppliers.

In the information processing industry, convergence may well play the same role as economy of scale did in the automobile industry. Neither the IBM nor AT&T groupings seem cast for the role of General Motors and Ford Motor Co. The market is unlikely to become quite as standardized, and antitrust limitations may continue to have some force. The two firms, though, are clearly going to emerge as the preeminent structures in the industry. A large number of specialist companies, suppliers and distributors will be linked to them.

The parallel between cars and information processing is accurate in another sense. The whole information processing complex, like the automobile industry 50 years ago, seems to be moving toward greater stabilization on the vendor side. This is happening as the increasing sensitivity of the market to economy of scale, mass-marketing and company images raises the ante and weeds out the weaker players. The result may be that the industry structure is maturing even as the market enters its period of greatest growth. ■

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Special Section

WORKSTATION WARS

By Brian Jeffrey

IBM and AT&T may soon clash in the all-important microcomputer market, a market that is rapidly proliferating.

Micros started life as personal computers, and IBM has taken to calling them workstations or discrete microprocessor-based computing devices. No matter what they are called, micros are important to both companies for two reasons. First, there is going to be a large number of them — more than 60 million by the end of the decade, according to IBM figures. Second, they occupy strategic positions in the information processing market on the ▶

desks of Fortune 1,500 executives, managers, secretaries and clerical workers.

They are also found in the offices and homes of small business principals and professionals. Micros are the direct human interface to the whole information processing complex. They are the vehicles through which new value-added communications systems and services will flow.

In addition, micros are eroding many of the traditional equipment markets for terminals, word processors, small business systems, minicomputers and even typewriters and programmable controllers. In the next decade, any company participating in these markets or selling communications systems and services is going to have to cover its bases in micros. This point has not been lost on IBM or AT&T.

In 1980 and 1981, IBM introduced two microcomputer systems — the Intel Corp. 8086-based Displaywriter and the Intel 8080-based System/23 Datamaster. These were mainly entries into traditional IBM lines of business, but aimed at lower level technologies such as word processing. It was in August 1981 that IBM moved into the then fast-growing personal computer market. At that time, personal computers represented a distinct type of product, a self-contained microprocessor-based system, typically in the $2,000 to $5,000 range with peripherals. Although personal computer users represented an occupational cross-section of U.S. business, they were typically young, well-educated and technically literate.

The distribution channels were specialized computer stores, and the applications were distinctive. Visicorp's Visicalc, which had done much to launch the whole market, was the leading package, and a handful of sophisticated word processing and data base management packages backed it up. Beyond these, there was a massive library of programs provided by third-party developers.

BY THE TIME IBM made its entrance, the market was changing. More than any other company, IBM was responsible for fragmenting the market. By the end of 1983, it was fielding a line of microcomputers that had grown from the Personal Computer to include the Personal Computer XT, the 3270 Personal Computer, the Personal Computer XT/370, the CS-9000, (a Motorola, Inc. 68000-based engineering workstation) two versions of PCjr, two 3270 terminals with personal computer bolt-on units (the Personal Computer/3278 and Personal Computer/3279) and, for the Japanese market, the 5550, an 8086-based Kanji character workstation.

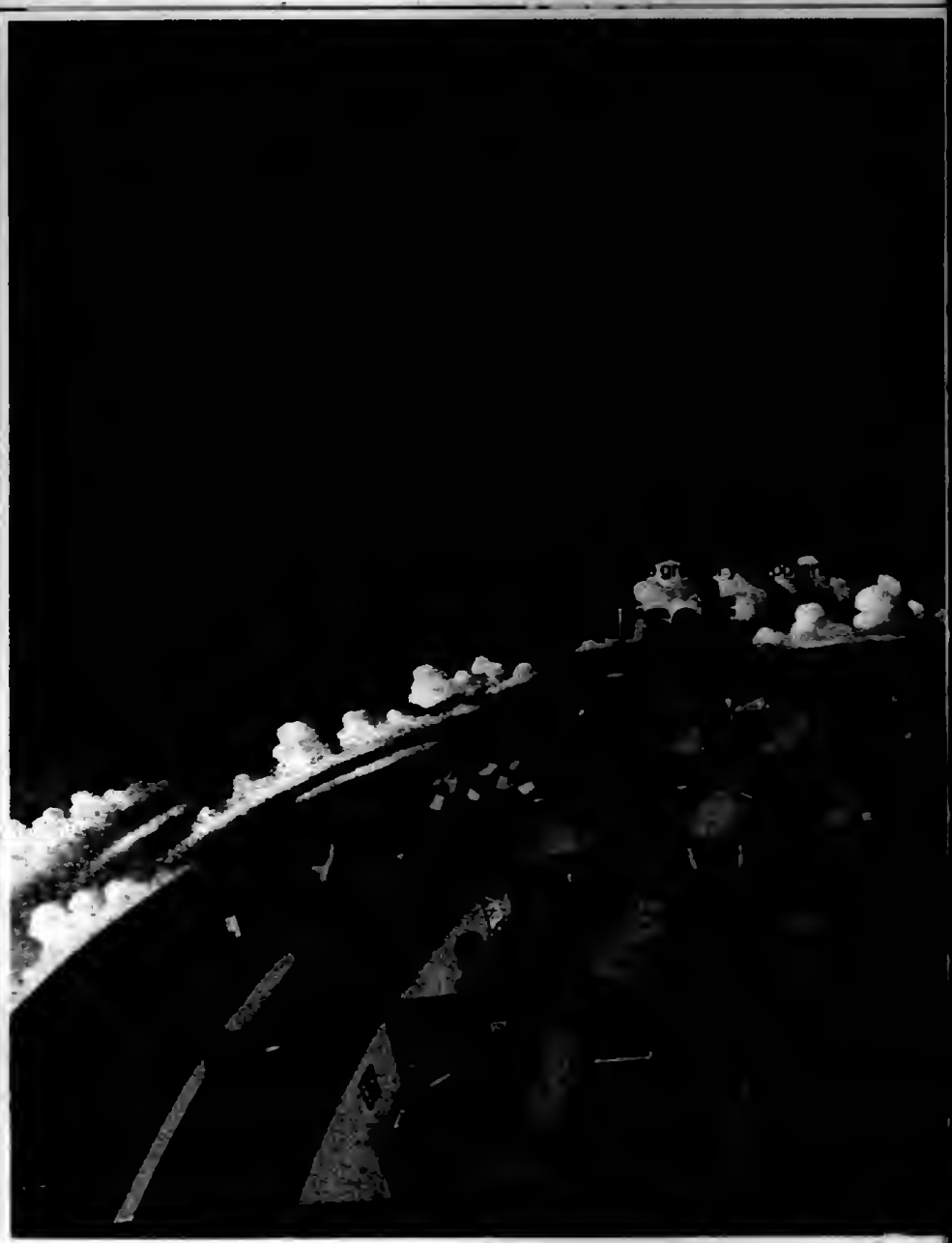
By year-end 1983, IBM had been marketing the Displaywriter and System/23 for some time and was preparing several new products in the supermicro and low-end brackets. IBM broke the microcomputer market into a number of distinct segments served by separate products and distribution channels. Briefly summarized, IBM's micro markets are:

■ *Host workstations.* These are for use in the Fortune 1,500 or other organizations with IBM central host processors. They are sold by the National Accounts and National Marketing Divisions. They combine the ability to manipulate host data with full-scale communications, personal productivity tools and software permitting local treatment of host data where appropriate.

IBM's mainstream product is the 3270 Personal Computer, which combines an Apple Computer, Inc.-type multiwindow format with personal productivity tools such as spreadsheets, light-duty word processing, personal filing and note pads. In short, the 3270 Personal Computer closely follows existing work patterns, and a clear distinction is made between mainstream — for example, host — and personal applications.

IBM offers the Displaywriter for secretarial applications involving heavy-duty word processing. Less sophisticated capabilities are available with the Personal Computer/3278 and Personal Computer/3279, or at the bottom of the line, the 3178 dumb terminal. Other products include variants of the Personal Computer XT supporting Visicorp.'s Vision and Lotus Development Corp.'s 1-2-3, which allow more sophisticated local treatment of host data. The XT/370 is designed for host programming and specialized data treatment, while the 4301, a desktop version of the 4300 series, facilitates more sophisticated executive and professional users.

The workstations in the Fortune 1,500 line are basically optional components of the total Systems Network Architecture (SNA)-based communications and office automation scenario offered by IBM. They support the data, text and, in the near future, voice capabilities available under this architecture. Leasing terms are available from IBM Credit



Corp. for the conversion of existing terminal bases and the installation of bulk lots of the newer workstation products.

■ *Small business systems.* These are for use by small organizations with up to 20 employees that cannot cost justify a larger system in the 30 series bracket. The primary requirement of these users is the automation of such procedures as accounting, inventory control, sales data management, letter preparation and mailing list management. These users require a considerable amount of hand-holding, particularly if they are converting from manual procedures, as is usually the case. For these users, IBM offers the Personal Computer XT, also available in an entry-level model, the Personal Computer and the System/23 Datamaster. The latter, however, is likely to be replaced by a new advanced workstation, a supermicro providing multiuser capabilities and allowing a migration path upward from the XT for the growing business.

This market is served by value-added dealers, which provide specialized software, support and guaranteed service, or by the local IBM Product Center, which provides less hand-holding but undertakes service, maintenance and training on a special basis. Alternatively, if there is no IBM Product Center in the vicinity, the Personal Computer and the XT may be purchased from a third-party retail store.

■ *Utility computers.* These are intended for users who already possess or have access to an IBM business computer or who otherwise do not require full-blown microcomputer capabilities. They are used mostly in the home for light-duty business processing in the evenings or on weekends. They are used to automate typing and for entertainment, personal filing, educational applications for children and students, on-line data base access and consumer electronic mail.

IBM's main products in this category are the two versions of the PCjr. The company is planning to add high-capacity storage media, video and data capabilities and access to videotex services. Later products will include a convenient portable system and a personal communications system to stay in touch while driving to work or traveling.

This market may be reached in two ways. First-time computer owners and purchasers will be able to obtain the new systems via IBM Product Centers, third-party computer stores and selected consumer retail outlets able to satisfy IBM marketing and service requirements. In addition, large-scale direct mail and telemarketing will be used for direct sales and to draw potential customers to local IBM Product Centers.

■ *Minicomputer-type systems.* In this market, powerful micros can take the place of older minicomputer systems for scientific, engineering, educational and some low-end business applications. IBM products also complement its larger minicomputer (Series/1) and mainframe (4300 series) lines. They include the CS-9000 and 4301, the latter representing the 4300 series, whose capabilities for scientific and engineering applications have not been reflected in their market penetration. Selected accounts are served by IBM Instruments and other specialized units. For the remainder of the market, conventional OEM channels are used.

■ *All-purpose small processors.* For this market, IBM offers stripped-down Personal Computers on an OEM basis. They may be used for a variety of control applications, factory device control, energy management and communications control. IBM already uses the Personal Computer for such applications in its own product line and will assist customers in the development of similar uses.

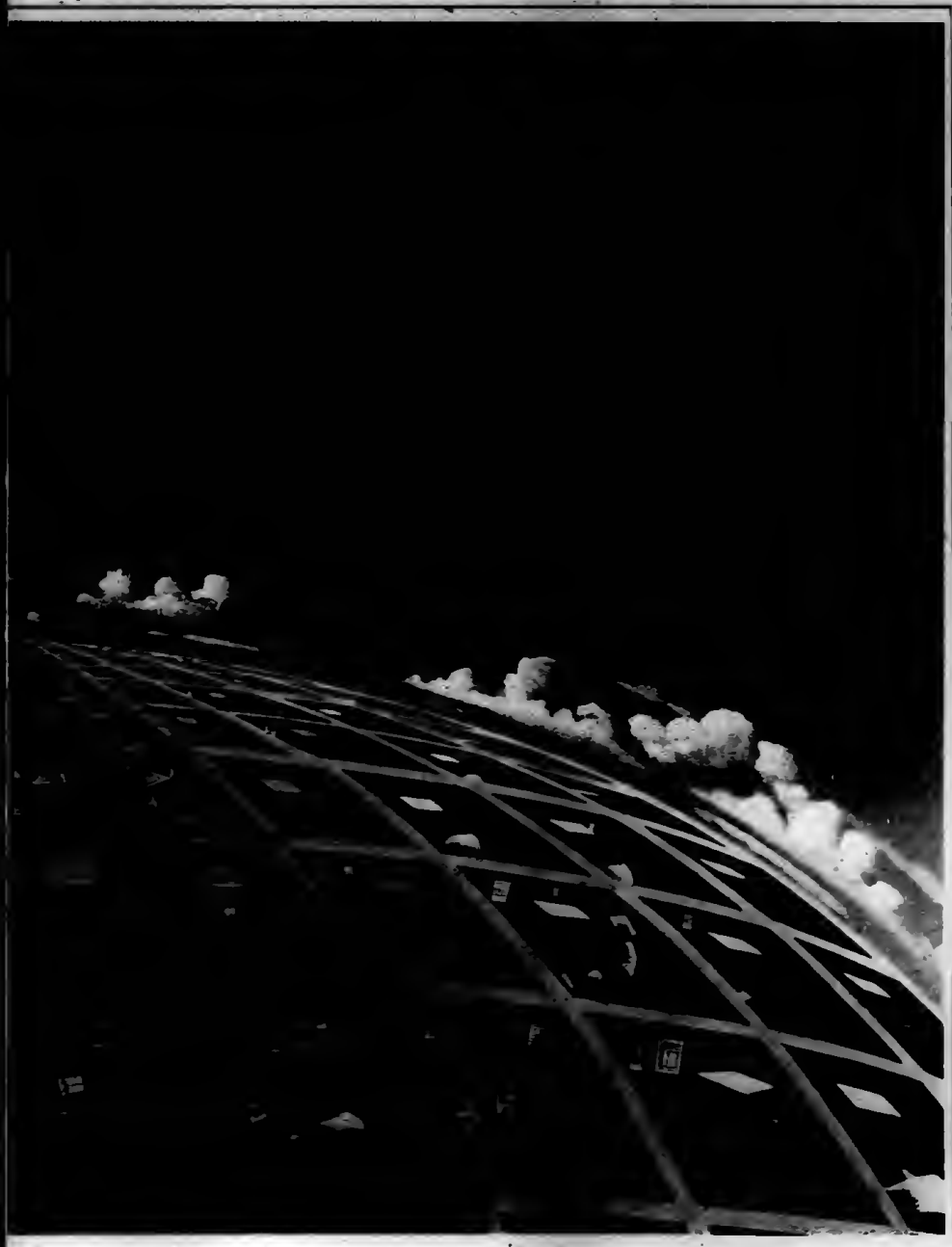
■ *Classical personal computers.* Users of these units are mainly interested in tinkering with applications such as Visicalc and Dungeons and Dragons, rather than serious applications. This user really should be buying an Apple IIe or a Lisa, but if he wants to buy from IBM, he can get a Personal Computer or an XT from a computer store or an IBM Product Center and run PC-DOS, Concurrent CP/M or Vision.

So much for the Personal Computer. IBM has, in fact, done an effective demolition job on the original market, channeling microcomputer technology more into its traditional lines of business and enabling it to leverage its corporate strengths. One of the more regrettable side effects, of course, is that IBM has pulled the rug out from under vendors such as Apple that have continued to build better products in the belief that this was still the key to success.

Like IBM, AT&T appears to recognize that microcomputers will be most useful supporting its mainstream lines of business. The three areas in which micros could perform this function at AT&T are:

■ As communications terminals for services such as AT&T Information Systems' Net/1000 and consumer and business videotex services.

■ As workstations in Fortune 1,500 environments, forming part of an



office automation scenario centered on the System/85 private branch exchange and its successors.

■ As options under a Unix architecture, forming the low end of a processor line passing through the minicomputer and potentially mainframe brackets.

It would make sense for AT&T — and IBM — to field an overlapping product line and bracket the market with a range of targeted distribution channels. Fortune 1,500 markets would probably best be handled by direct or joint marketing with a line that overlaps at the high end with the Unix line.

One such machine could be a 32-bit processor for the management and executive user, a more powerful and complex model than the IBM XT/370. It would be used for programming and specialized treatment. Other products for users with less demanding requirements could include simpler intelligent and dumb voice and data workstations such as the IBM 3270 Personal Computer, Personal Computer/3278, Personal Computer/3279 and 3178. Full communications support and industry standard operating systems and applications options would probably also be supported.

For the communications terminal market, AT&T wants to use its existing marketing strengths supported by direct mail, telemarketing and so on for the consumer and small business markets. It would also like to employ a variety of third-party retail and distributor channels.

For the Unix market, including the conventional minicomputer and supermicro markets, overlapping OEM and value-added channels would supplement AT&T's other marketing activities and cover any market niches not reached directly.

At this point, it is still unclear what AT&T will use as products. It has no presence in the existing microcomputer market and needs to penetrate the market fast, particularly in the office automation and communications services fields. Acquisitions are a possibility.

However, the most likely option involves partial buy-ins and/or marketing and development tie-ups with companies like Digital Equipment Corp., Apple and Commodore Business Machines, Inc. and others with market presence in key areas.

The synergy with Apple, for example, is so obvious that it would be surprising if it did not result in a relationship between the two. This would not preclude AT&T from introducing its own products either immediately or at a later date. As IBM has demonstrated, product overlap is a lesser evil than leaving gaps in the marketplace.

Competition between IBM and AT&T seems to be shaping up across the board, initially in Fortune 1,500 office automation markets, but later in the mini and supermicro fields.

Both companies will be competing more against other vendors than each other for a while, but given the speed with which IBM is coming on in this market and the likely impact of an AT&T entry, they are inevitably going to clash.

The communications terminal sector also looks set for a face-off. IBM is already promoting its business micros as information network terminals, and videotex access for its Personal Computer, XT and PCjr lines is a key component of IBM's move into this area this year.

The two firms are clearly going to be competing heavily for this market by the mid-'80s, with IBM initially pushing CATV-based services and AT&T pushing conventional on-line services.

IN THE FINAL ANALYSIS, IBM's marketwide quality, service and support will play a crucial role. In buying an IBM micro, one is essentially buying IBM. There is a wide range of products available according to taste and requirements, but the particular box chosen is really a secondary concern. AT&T will stress conservative values like compatibility, reliability and service. This takes the focus of competition off a box-for-box, feature-for-feature basis.

That focus turns to IBM's name, its service organization and its ability to offer a totally integrated SNA-based communications scenario and videotex services to Fortune 1,500 firms.

IBM has reached a point at which AT&T is virtually the only company that can compete with it effectively. Like IBM, AT&T is likely to place the focus of competition on the capabilities of its organization and perhaps also its affiliates. It is clearly able to handle the same kind of mass-marketing campaign that IBM has begun.

The majority of potential micro users are uncomfortable with the new technology. IBM and AT&T offer reassurance in a field of vendors, most of whom still stress leading-edge capabilities. ■

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Special Section

MORALE AND MANAGEMENT

By Alain Desrenne

The business of competing has received much attention lately, particularly in relation to AT&T, a company that supposedly cannot compete. IBM, on the other hand, has become a very competitive company.

This is a striking contrast, but just a few years ago, IBM was also known as a company that could not compete. Critics said that even though IBM was strong in the mainframe market, it could not compete in the newer, faster moving markets.

By the late '70s, IBM had acquired a reputation of being ▶

a musclebound giant. It was perceived as slow-moving, bureaucratic and riddled with a reluctance to consider solutions from outside. For much of the decade, it had mounted challenges in markets that had done less than set the industry on fire, such as the minicomputer and word processing equipment markets. Yet in October 1981, it began a massive corporate reorganization that preceded a blizzard of new product introductions, aggressive pricing and marketing strategies, innovative uses of third-party distribution, tie-ups with other companies and lawsuits.

Contrary to the general opinion in the industry, IBM accomplished this without large-scale outside hiring. The new "lean and mean" IBM is composed of many of the same people as the old IBM. The managers are long-time staff members, who only a year or two ago were running their bit of what was generally regarded as one of the most hidebound companies in the industry.

THE NEW SPIRIT AT IBM should not have come as a great surprise. As IBM employees like to point out, IBM had always been competitive. In the '50s and '60s, it fought a hard battle for the mainframe market and, in the '70s, fought off a new wave of competition from the plug-compatible vendors.

Moreover, IBM had always been competitive internally. Contention management, as IBM employees describe it, had always been the norm, with groups within the company competing heavily with each other. During the '70s, its three divisions serving the Fortune 500 market — the Data Processing Division (DPD), the General Systems Division (GSD) and the Office Products Division (OPD) — fought an intense, if fratricidal, battle for the office automation arena.

IBM's apparent lack of competitiveness was due to its preoccupation with host mainframes. Although it continued to market lines of office and small business products, IBM had become for all practical purposes a single-product company. It sold mainframes.

Like all single-product companies in a fast-changing industry, IBM discovered that success carried the roots of failure. The establishment of the 370 series architecture as the industry standard and the accumulation of end-user software investments reduced the game to an orderly hardware price/performance progression. This was dictated less by competition than by IBM's internal requirements. Even the appearance of the plug-compatibles did not significantly alter this situation: It just speeded up the process.

With an ongoing antitrust suit limiting the possibilities for diversification and with slowing growth and an aging management structure, IBM began to stagnate. Throughout the '70s, the mainframe lobby — composed of IBM employees who believed that very little of interest in computer technology had occurred since the mainframe — persisted in trying to fit the new technologies into the old mold. Systems Network Architecture (SNA) was introduced as a response to the appearance of minicomputers in IBM's large accounts. Even such things as word processing, local networking and personal computers were similarly dealt with by hanging them off hosts. Some of IBM's host-based office automation systems are perhaps best forgotten. Products such as the token-ring local-area network and the recently announced 3270 Personal Computer suggest that this orientation is far from dead.

The smaller systems groups, notably the GSD and the OPD, were more aware that a more effective response was necessary. As a result, systems such as the Series/1, 5520, Displaywriter and the Personal Computer began to find their way into large accounts to the confusion of all concerned. However, the small systems business, tended to be regarded as a sideline. It did not have a high status within IBM.

By the late '70s, the situation began to receive serious corporate attention. The company was losing many of its younger, more entrepreneurial managers. In addition, career blockage, IBM's commitment to lifetime employment, was reaching epidemic proportions. In addition, frustration with the firm's poor showing in the newer, high-growth markets was mounting.

The "wild ducks" — IBM's term for its more original and entrepreneurial managers — were traditionally tolerated rather than valued inside the company. But they were increasingly seen as a vital resource. With growth moving away from the old host complex and toward newer areas and with the prospect of the antitrust suit being dropped, IBM was going to need that type of manager to compete in new markets.

The reorganization and the large-scale diversification that began to be prepared in the 1979-80 time frame were to some extent a

response to this. While management dissatisfaction was far from the only consideration in planning for the new structure and priorities, it was important. It was unusual for a U.S. corporation to factor employee satisfaction into multimillion-dollar diversification decisions. However, IBM has always been out of the mainstream of large U.S. firms in its emphasis on employee commitment and lifetime employment.

Whatever the intentions, the results were clearly beneficial to the wild ducks. In a massive series of reshuffling and diversification moves that began in 1981, management hierarchies were dislodged, and poor performers were sidelined en masse. The creation of new functions in new organizational units — notably in small systems and the independent business units — opened up opportunities for many of the more entrepreneurial managers.

The reorganization also created a structure that enabled the competitive spirit to be channelled outward against other companies rather than inward against other units within IBM. The National Accounts Division took the large accounts, and the National Marketing Division took the others. In addition, various independent units — later consolidated as the National Distribution Division — took third-party channels. Product development and manufacturing functions were consolidated to respond to their respective needs.

To deal with the problem of product overlap, IBM developed separate lines for each major market segment. The Fortune 1,500 market was turned over entirely to the mainframe lobby. Separate product distribution complexes were set up for such areas as small business systems, home and personal computers, OEM minicomputers and microcomputers, communications products and services and consumer products.

Distribution complexes were also set up for factory automation equipment, instruments, computer-aided design systems, medical electronics and specialized displays. In each case, the aim of the IBM unit handling the complex was to gain a share of the market. Overlap between product capabilities was dealt with by ensuring that separate distribution channels reaching distinct market segments were used. There were to be no repetitions of the office automation wars between the DPD, GSD and OPD.

IF THIS TRADITIONAL competitive spirit at IBM was to prove an asset, so, it turned out, was the traditional IBM corporate culture. This culture had always stressed a handful of key values — quality, reliability and service — rather than the advantages of particular products or technologies. As a result, its products obtained a reputation for being less than state-of-the-art. This was true, but beside the point: IBM was not competing on state-of-the-art technology. In the '50s and '60s, the key values were effective in the mainframe market.

IBM's emphasis on quality, reliability and service was singularly appropriate for host computing, a new technology that was still treated with suspicion in many organizations. Moreover, the introduction of host computing and the emergence of corporate DP centers meant the centralization of business data and processes on a single point of failure. Reliability, support and service, which IBM had made its keynotes, were powerful competitive tools.

This approach also proved effective in the office automation market during the '70s, serving to counteract the effects of some less than impressive systems. However, it seemed that the emphasis on realiability and service did not carry much weight in newer, faster growing markets outside the large accounts — for example, personal computers. But it soon became clear that that assumption was not right. IBM began a late-entry strategy with the IBM Personal Computer and, more recently, with other products and services.

IBM's strategy is clearly to let others pioneer a market. Leading-edge products are bought by leading-edge users. IBM enters at the point when products are standardizing and when the market is beginning to extend to the mainstream of business users — a group that is far more receptive to the issues of quality, reliability and service than pioneer users.

Seen in this perspective, IBM's rather staid corporate culture is proving to be a massive competitive asset. There was no need to change it to make the company more competitive, and IBM did not try to do so.

The net result was that IBM emerged in the '80s with few changes in its culture or orientation. It made a few technical adjustments. These involved breaking the hold of the mainframe lobby on corporate decision-making and confining it to the Fortune 1,500 market. It also involved rechannelling the energies and competitive spirit of its younger entrepreneurial managers into broader and newer markets. All in

all, it was not a bad performance.

IBM's problems, however, are insignificant beside those of AT&T. The company behaved like a utility for longer than anyone could remember and was heavily regulated for much of its history.

In 1968, the Carterfone Decision changed all that. In the wake of the decision, divestiture of the operating companies and the adoption of a more competitive posture became pressing needs as a slew of new competitors began to take chunks out of the company's markets.

As in the case of IBM, however, it would be a mistake to underestimate the extent to which AT&T was competitive during the '70s. AT&T was hampered by its existing commitments to the Dimension PBX line, regulatory problems and a natural reluctance to show too much aggressive behavior while the divestiture case was still in progress. Nevertheless, AT&T did compete heavily with the Interconnect PBX vendors, companies offering bypass long-distance telephone services, suppliers of customer-purchased telephone equipment and the like. The utility mentality was perhaps strongest in the operating companies and the Long Lines Division. Under the new structure, the former will no longer be part of AT&T, and AT&T Communications, the successor to Long Lines, will remain regulated. Moreover, as many AT&T staff were given the option of going with the regulated or unregulated entities, it is clear that many of the utility-minded have taken themselves out of the picture. And others have chosen early retirement.

In the remainder of the organization — and particularly in AT&T Information Systems — many of the same changes that have been noted in IBM also occurred. A succession of restructuring moves has broken up much of the entrenched management hierarchy. This reorganization left a new generation of managers, typically in their 40s or younger, in decision-making positions in most parts of the organization.

Moreover, some fairly substantial efforts have been made to overcome one of the key weaknesses of the old AT&T organization — the lack of contact between its different components. In addition to personnel transfers and changes in reporting structures, AT&T has run programs to put Bell Laboratories and Western Electric engineers out into the field.

The results, while variable, nevertheless belie the idea that AT&T is still the same static organization it was in the past. Similarly, most of AT&T Information Systems' regional units have been engaging in some fairly heavy training and retraining, and focus groups have been organized. In addition, customer interface sessions are occurring on a scale that would have been difficult to imagine only a few years ago.

Like IBM, AT&T also has a surprisingly strong tradition of internal rivalry to draw on, mostly between its regional units. Competition on service performance has been strong within the company for a long time. With service clearly a major competitive edge for the new competitive entity, it is a significant factor in assessing AT&T's likely future performance.

Unlike IBM, however, AT&T has gone in for some large-scale outside hiring exercises and has made deliberate attempts to change aspects of its culture. A group of executives recruited from outside by Archie McGill, the former president of American Bell, Inc., began to lay down potential changes in the mid-'70s. For a while, it looked as though American Bell, which has since been renamed AT&T Information Systems, was going to go in the direction McGill proposed. It would move toward becoming a systems vendor like IBM, with a product line and marketing staff drawn heavily from outside sources.

THE DEPARTURE OF McGill and many of the executives he brought in with him was perhaps inevitable. The dispute clearly went deeper than differences over product strategy and reporting structures. According to AT&T sources, the issue involved the extent to which AT&T was going to remain a communications company rather than a systems vendor. Many felt that McGill and his counterparts were taking the company too far too fast.

In retrospect, they were probably right. AT&T possessed a strong corporate culture, and that culture was heavily geared toward telecommunications. That covered such areas as PBXs and transmission technologies and involved a heavy orientation toward reliability and service of the communications infrastructure within companies. Thus, AT&T was probably in a better position than IBM, with its host mainframe focus, to take advantage of the convergence of computer and communications technologies.

An attempt to follow IBM onto its home ground would have been

difficult to manage. At a time when AT&T was having severe problems just getting its new structure to function properly, such an attempt made little sense. As a result, AT&T seems to realize that, for now at least, it is better playing from its strengths — which aren't small.

The introduction of outsiders at lower levels also seems to have caused more problems than anticipated. Originally, AT&T Information Systems planned a 50-50 mix of outsiders to veterans at corporate levels, with regional and functional units handling their own outside recruitment.

While integration problems were expected, the intensity of the frictions that developed between veterans and outsiders seems to have surprised everyone. The management styles of the newcomers were often highly individualistic and authoritarian. The rationale for this was that they were brought in to put the outfit in better shape, and that they should start by making a few changes. This was especially dangerous at AT&T, considering the many younger managers who regarded the reorganization as an opportunity to further their own careers within AT&T.

Those who seem to have adapted best to the AT&T environment tend to be managers not far removed from the archetypal AT&T employee — those who previously worked for companies with strong corporate cultures emphasizing organizational commitment rather than personal performance. The lesson has been learned, and outside hiring is being played down. The net result is that AT&T, like IBM, looks like it is coming through the reorganization and reorientation with a new generation of management, new perspectives and a largely intact corporate culture stressing quality, reliability and service. But IBM is still heavily oriented toward data processing, while AT&T is oriented toward communications.

The typical IBM employee and the typical AT&T employee also show some interesting similarities in personality. The new entrepreneurial managers are a slightly more complex breed than appears at first. AT&T and IBM sources agree that the best managers are those who are not motivated purely by personal success. They are, of course, not immune to financial considerations or to organizational power, but they also derive satisfaction from being part of a large organization in which their views carry some weight. As one AT&T executive, formerly with IBM, put it: "Some of us like to feel that we can influence the way things go, that what we do is going to matter. The financial considerations are there, of course, but I could probably do better with a smaller company. I like the kind of commitment here to customer service, that kind of thing. And I can have more of an influence here than in a smaller company."

BOTH IBM AND AT&T are sensitive to the issue of morale. The results of IBM's morale extend not merely to its own employees, but to its customers, competitors and the press. It seems to be taken for granted these days that IBM will succeed in whatever it touches. It is becoming a self-fulfilling prophecy. This is strong medicine for a corporate culture that lays strong emphasis on the organization's success and whose managers are often organizational entrepreneurs. IBM staff members feel they are no longer part of No. 1, to use the old '70s term. It is a little more than that. They feel they are part of The Winner, a firm that is visibly surpassing its competitors in one market after another.

AT&T, understandly, is not matching this. Poor press, the uncertainty surrounding the company over the last few years as its divestiture ran through the courts and the effects of having outsiders parachuted in to key positions have done much to keep AT&T morale low. Nevertheless, there are clearly good bases for a recovery. A new generation of management, a strong corporate culture and the company's financial, technological and marketing strengths suggest that a sustained show of competitive performance could get AT&T's personnel into the same kind of self-fueling morale that IBM has enjoyed.

Competitive has a different meaning for IBM and AT&T than it has for most other firms. Both hold the high ground in terms of market presence, and both compete less on products than on values. They sell a kind of security that is attractive to much of the market. The values of quality, reliability and service are deeply embedded in their corporate cultures and maintained by managers and staff who feel motivated to do so.

The concept is simple — good organization, good teamwork, good morale. People..

And for the competitors of IBM and AT&T, it is something to think about for the next strategic planning session. ■

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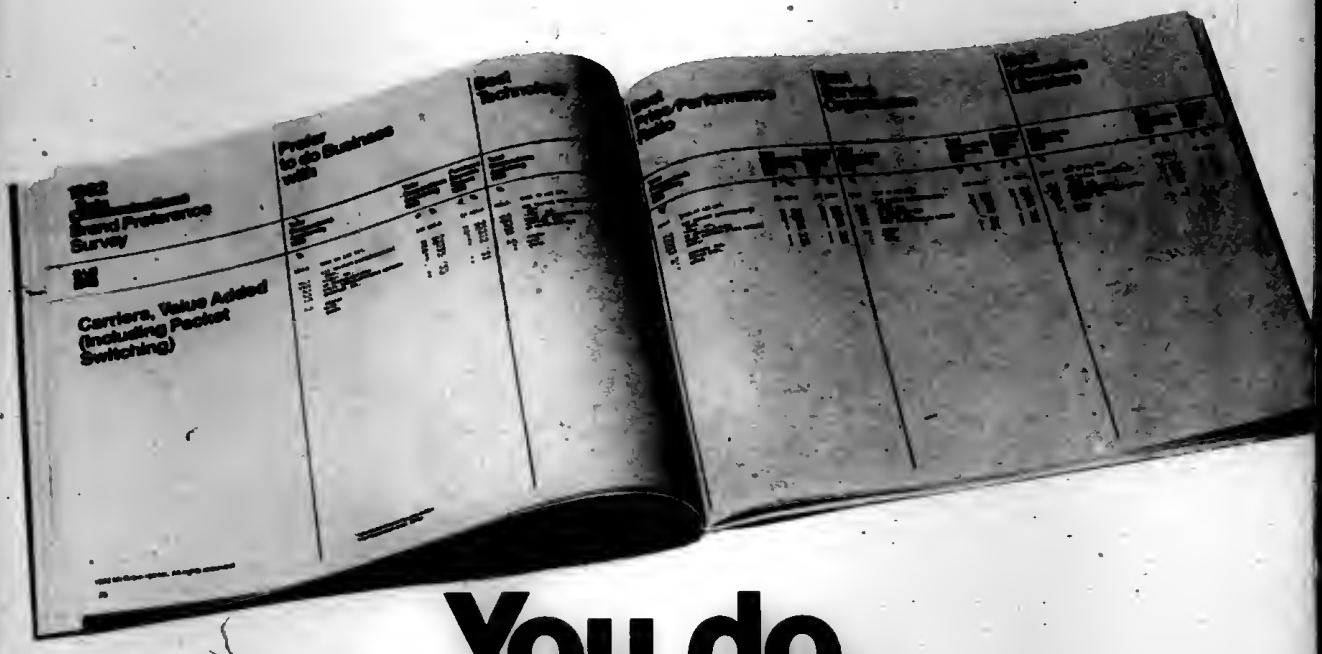

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Special Section

IN THE BALANCE

In November 1981, Michael Killen, president of the San Jose, Calif.-based consulting firm, Strategic, Inc., raised eyebrows and hackles when he boldly predicted that "Xerox [Corp.] is headed for the worst failure in the company's history. When Ethernet fails, everything will go with it."

Of course, Ethernet, Xerox's ground-breaking local-area network, did not fail, but the degree to which it has succeeded is still a matter of debate. At any rate, Killen's dire prediction put him and his company on the map. Since then, he has made many more predictions in the reports Strategic churns out on a variety of information processing subjects.

Computerworld On Communications *Editor Bruce Hoard contacted him recently to see how he views the possibility of future conflict between IBM and AT&T.* ▶

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ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).
ASYNCHRONOUS Start-stop communications technique used by low-cost low speed ASCII terminals and Personal Computers.
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tion. Used here as synonym for an ASCII host.
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SDLC (Synchronous Data Link Control). Line protocol for data communications between IBM systems and terminals.
SNA (System Network Architecture). IBM's approach to data communications networking.
SNA/SDLC IBM communications; non-compatible with DEC (ASCII) communications (without PCI).
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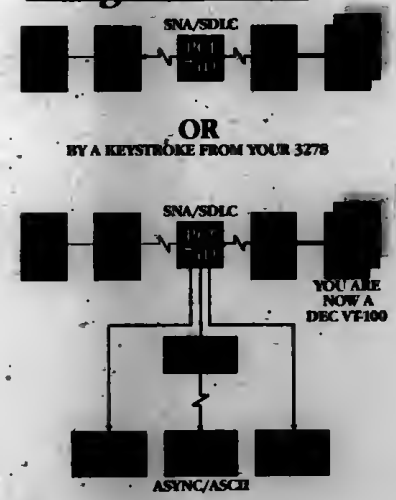

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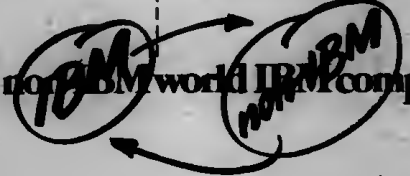


MICHAEL KILLEN

How competitive do you think IBM and AT&T will be over the next five years and in what areas?

AT&T will be as superior as they are right now in all types of communications. IBM will be no match for probably four years. However, within the office — except for its [private branch exchange (PBX)] — AT&T will have a real tough row to hoe.

IBM is trying to work with several of the Bell operating companies to fulfill its needs for local communications, and I think within a year we might hear some announcement where one of the Bell operating companies teams up with IBM in one or another area of communications.

"There is hardly any equipment out compared with what's going to be out in five years. They're both going to clash in office automation, and even though it's a little early to say right now, IBM will blow AT&T away."

To do what?

To complete the local loop-type transmission requirement, mostly within a city, not between cities, but communications within a city. Right now, IBM has nothing in the area of local communications. Take the city of Boston for an example. IBM has an interest in being able to have one company within Boston and another more easily communicate with each other — their data processing equipment, their office automation equipment. It is possible and likely that IBM will work some kind of arrangement with a local company. I've picked up information that Bell operating companies are already talking to IBM.

Refocusing this a little bit, what do you think will be the key areas of their competition? It sounds like you are saying, "One will be here, and one will be there." When they come together, where will they clash? Or will they keep dancing around each other?

I think they're going to clash. In the next three years or so, AT&T's No. 1 priority has to be to solidify its communications business in a competitive and a noncompetitive environment. That is one of its main goals over the next few years. But at the same time, one of its major priorities is to take its PBX line and expand it into office automation.

IBM's goal in the next few years is to move further away from data processing and more into office automation at all levels. That means both companies are moving toward each other. Both know that whoever controls the equipment on your desk or in your home has a lot to say about where you go to get your communications services. Office automation markets are exploding. But there is hardly any equipment out compared with what's going to be out in five years. AT&T wants a big chunk of that. So does IBM. They're both going to clash in office automation, and even though it's a little early to say right now, IBM will blow AT&T away.

Why?

By the late 1980s, the home computer, or the home information system,

should really come into its own. And at that point, IBM's test market for its IBM Personal Computer program should be over, and IBM should be going at the home market with some incredible home information products. At that point, there will be a need for people that have these systems in the home to communicate with companies and other people.

Thus, communications suddenly becomes much more important. Now, AT&T knows that too, so their goal will also be to put a tremendous amount of equipment in the home. The two of them are going to fight to put the equipment in the home, and later they're going to fight for the communications business that will be generated by that equipment.

"Remember, AT&T is going to be out of the local loop. The regional telephone companies and the independent telephone companies have that business. One thing AT&T must do is get back in the loop, especially if the old Bell operating companies get too friendly with the IBMs and MCI [Communications Corp.'s] of the world."

How could IBM control that communications business? By the kind of deals you're talking about with the Bell operating companies?

That's one possibility.

It seems like AT&T would be the odds-on bet to grab that communications portion of the deal.

Remember, AT&T is going to be out of the local loop. The regional telephone companies and the independent telephone companies have that business. One thing AT&T must do is get back in the loop, especially if the old Bell operating companies get too friendly with the IBMs and MCI [Communications Corp.'s] of the world.

AT&T could set up arrangements with cable companies, not necessarily buy them if they didn't want to, but really have long links with the cable TV companies. Then AT&T could bypass the local companies. Everybody can go in a lot of different directions.

How anxious are these two companies to battle each other?

They're both paranoid of each other, I think. They're both thinking about each other. For example, take the Entry Systems Division people at IBM. Their strategy is to consider putting Unix 5 on a multiuser micro. With this rationale, AT&T is the licenser for Unix.

If IBM puts it on a micro and pays AT&T a license, it steals a lot of thunder from AT&T's assets with respect to Unix. AT&T will get a license fee, but IBM will keep its momentum going on selling systems and making money on the hardware.

That is something that is constantly being tossed around at IBM as an offensive and, at the same time, a possible defensive move against AT&T.

Is it possible that one company could really hurt the other?

I don't think so. Each of them now has lots of alternative strategies. For example, IBM now has 15% of Rolm [Corp]. I don't think they've even begun to leverage that link. Even though Rolm announced a

new PBX recently, it is just the tip of the iceberg when it comes to possible alternatives for IBM.

What about users? How do users stand to gain from competition between IBM and AT&T?

Only the smart and well-informed will really benefit. There are going to be many more alternatives so the uninformed user isn't going to be able to pick out the best approach.

How does one become informed to the point where one can choose intelligently?

Users have to hire the best telecommunications and data communications people they can find. They have to nourish them, send them off to seminars, make sure they read everything. They have to go in and hire people from the old Bell operating companies, from the AT&T companies, from IBM. They've got to put bucks in — into people and into educating them.

"Changing from a noncompetitive business to a competitive business doesn't happen overnight. It is going to take AT&T three, maybe four years before they really have a good sales organization. Right now, they're playing a lot of games. They have assets that companies like IBM and telecommunications firms don't have."

Conversely, how do users stand to lose?

By not being informed and not making investments properly with respect to data communications and telecommunications.

Much has said about the lack of aggressive, competitive sales experience at AT&T. How much will that hurt them against IBM?

It will hurt a hell of a lot. Changing from a noncompetitive business to a competitive business doesn't happen overnight. It is going to take AT&T three, maybe four years before they really have a good sales organization.

Right now, they're playing a lot of games. They have assets that companies like IBM and telecommunications companies don't have.

They take a look at all the expenditures a company has going toward AT&T companies, what kind of equipment they have on lease, whatever. And then they say, "If you buy new equipment, say in a different area, we will change your lease rate, your rental rate, whatever."

Sounds like the old migration strategy.

That's right. And what they are getting rid of is the stuff they're going to lose anyway. So they have a lot of installed equipment that they are changing to help them move forward into other areas.

How do other companies stand to gain from IBM vs. AT&T?

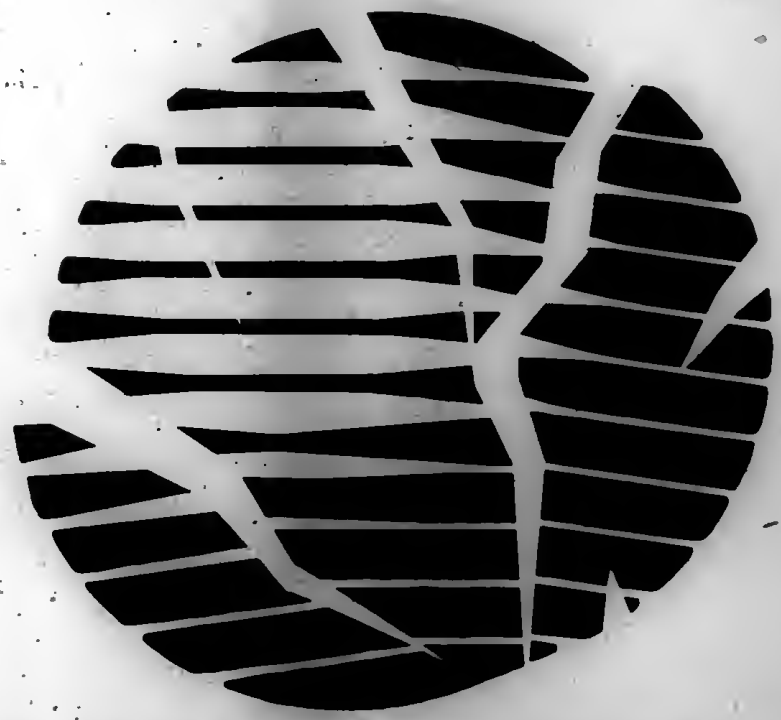
The little guy that makes computers or telecommunications equipment cannot hope to fight in the main line in the future. He can only pick peripheral markets that the two giants do not want and cannot handle. The two giants are just too big.

If you were IBM and planning to fight AT&T, where would you try to probe?

Right now, the only thing to worry about with AT&T is communications. Develop real good relationships with all the independent telephone companies. In addition, develop real good relationships with the cable TV companies so the transmission path is secure.

If you were AT&T, what do you want to do? How would you attack IBM?

I'd probably want to acquire channels of distribution, good sales organizations. It would be real nice for AT&T if they acquired Radio Shack. AT&T can build anything today if it really wanted to. The problem is conceiving the product and selling. They could go on an acquisition craze. ■



THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME

BY ALBERT H. KRAMER

According to conventional wisdom, the telecommunications industry is about to undergo a fundamental revolution, a sea of change spawned by the 1984 divestiture of AT&T and the ongoing deregulation of major industry sectors and players.

The common myth — widely popularized by policymakers and the press — is that divestiture and deregulation are about to bring about a new competitive era.

But this era may not be quite what it has been made out to be.

Certainly, changes have occurred and will continue to occur. Already, the previously unheard-of has become common. AT&T is moving rapidly to sell equipment it once only rented. The soon-to-be-disowned regional operating companies are bypassing Western Electric in favor of multimillion-dollar procurement contracts with competitive independent manufacturers, such as ITT and NEC Information Systems, Inc.

But these changes and the AT&T divestiture might not be the start of something new. Rather, they might lead to the continuation of something old. Pending the resolution of several crucial questions, a new environment that fosters maximum competition in the telecommunications industry may not emerge. Instead, U.S. Federal District Court Judge Harold Greene and Federal Communications Commission (FCC) Chairman Mark Fowler may merely have extended the theory of workable competition.

A brief history is necessary to appreciate the difference between workable competition and maximum competition. In the late '60s and early '70s — when the FCC and the courts were giving their initial blessing to the radical idea of opening the once-monopolized telephone industry to competitive supply — the theory of maximum competition prevailed.

The policies embodied in such landmark rulings as the Carterfone Decision (1968), the MCI Decision (1969), the Mebane Home Telephone Decision (1975) and the Specialized Common Carrier Decision (1971) were designed to let competition flourish. The evolution of full-fledged competition among hundreds of entrepreneurial companies was envisioned. The entrepreneurial firms would vie with each other and with AT&T and the independent telephone companies to provide a host of innovative products and services.

The doctrine of maximum competition probably reached its zenith in 1976 and 1977. The U.S. Supreme Court refused to upset the FCC's establishment of an equipment registration program, replacing AT&T's costly and anticompetitive coupler arrangements. AT&T had required an expensive coupling device before customers were allowed to interconnect their own customer premises equipment to the network, allegedly to protect the telephone network from harm. ▶

After several years of struggle, the FCC adopted a registration program allowing any equipment certified to meet network technical standards to be connected to the network by means of a simple, inexpensive interface device.

In another development, the U.S. Appeals Court reversed a different FCC decision prohibiting MCI to launch its Execunet business service. In addition, Congress rebuffed several attempts by AT&T in the early '70s and thereafter to have so-called "Bell Bills" adopted. These bills would have outlawed competition altogether.

The past several years, however, have seen the full-scale emergence of the new theory of workable competition. In its most basic form, the theory maintains that competition should be allowed, but it is necessary to concentrate on allowing the telephone companies and industry giants to compete with each other. The theory further maintains that new suppliers have been encouraged to enter new markets, and it is time to open the unregulated markets to the regulated carriers. The new doctrine first surfaced in 1971 in the FCC's Computer Inquiry I, which allowed the independent telephone companies to provide data processing services through separate subsidiaries.

Since then, most of the inititiatives in Congress, the courts and the FCC have been designed to allow AT&T to compete in the data field as well. This involves either circumventing or repealing the primary barrier to workable competition. This barrier is the U.S. government's 1956 Consent Decree with AT&T, which prohibited the dominant carrier from entering the unregulated, nontelephone markets, principally data processing. With the adoption of the FCC's Computer Inquiry II Decision and the court's 1982 Modified Final Judgment, AT&T has succeeded in removing the restraints on its entry into the data field and other competitive ventures on an unregulated basis. Computer II simply bypassed the 1956 Consent Decree by interpreting the decree to allow these activities. Judge Greene's acceptance of the revised 1982 antitrust settlement repealed the 1956 agreement altogether.

Thus, the doctrine of workable competition has now reached maturity — blessed not only by the Supreme Court and the FCC, but by the Reagan administration and Congress as well. Instead of creating a brave new world of multifaceted competition, the two landmark policies could hasten the demise of such multiple choices.

In addition, the "level playing field" — which Congressman Tim Wirth (D-Colo.) alluded to in referring to a comprehensive rewrite of the Communications Act of 1934 — could become merely a battleground for Star Wars-type clashes between the industry giants. The revision of the Communications Act would have mandated that the communications giants could compete on an "equal" basis with small, budding entrepreneurs trying to enter the fast-growing field.

Although Computer II and the Modified Final Judgment have provided important clues about the direction of policy in the coming years, there are still several crucial questions pending. The answers, which are expected in the next few months, will clarify the degree to which policymakers are committed to creating a new era of robust, open competition or whether they would merely prefer extending the policies of workable competition. The issues include the disposition of the Bell Systems' in-place telephone systems and wire, the establishment of separate subsidiaries for the regional Bell operating companies' unregulated activities and the operating companies' ability to expand Centrex services.

To what extent will AT&T be allowed to use its multibillion-dollar base of in-place customer premises equipment to manipulate the market through dumping campaigns or new migration strategies? If the FCC permits the immediate, as opposed to phased-in, deregulation of that customer premises equipment at less than net book value or allows certain offsets to net book value, expect a fire sale. This sale will significantly dry up the market for all but the largest competitive suppliers. It will also set the stage for a new migration strategy by locking customers into long-term contracts on old products. Only AT&T can free those customers from those long-term contracts.

Although the FCC was not expected to rule on the question until late 1983, there are two indications that a fire sale is coming. First, Bell acknowledges it has lost $8 million this year on the prederegulation sale of home telephones because state regulators did not set the sales prices at levels high enough to recover the full investment in customer premises equipment. Second, AT&T has announced it will write off $7.2 billion worth of equipment assets, with a net effect against this year's earnings of $3.8 billion. This will permit the equipment to be dumped at bargain-basement prices in 1984.

To appreciate the magnitude of the unprecedented write-off, one

must consider that the entire competitive interconnect industry sold $2.6 billion worth of equipment in 1983, only about one-third of the $7.2 billion pretax write-down of the same type of equipment AT&T took in one swift stroke of a pen.

Will the divested operating companies be allowed to use the same type of anticompetitive leverage with the millions of miles of installed inside wire they retain under the antitrust settlement? If so, expect them to use their bottleneck control of the embedded wire in a deregulated environment in familiar discriminating ways. This includes requiring customers of competitive customer premises equipment suppliers to buy the cable at exorbitant full replacement value, rather than the more equitable net book value. Unfortunately, neither Judge Greene nor the FCC has paid more than passing attention to the issue. However, several states, notably California and Texas, have implemented or are about to implement procompetitive plans that would require telephone companies to allow all customers to use that in-place premises wire for free.

Will the FCC require the operating companies to establish separate subsidiaries for the marketing of unregulated customer premises equipment, data products and enhanced services? A decision was pending at press time, with an appeal all but certain. Unfortunately, such a decision need never have been made if Judge Greene had accepted the original AT&T-Justice Department antitrust proposal, which would have removed the regional operating companies from the customer premises equipment business altogether. But in setting up the regional companies as the most viable competitive counterforce against AT&T Information Systems — the workable competition theory in action — Judge Greene has made it possible for most of the same threats that have plagued the development of full-fledged competition in the past to reemerge in the supposedly new environment.

In the past, such discrimination has taken two principal forms. The local telephone companies have used monopoly profits, derived from the provision of regulated basic local service to captive customers, to subsidize the price of their competitive unregulated customer premises equipment products and services. In addition, they have delayed service to users of competitive customer premises equipment firms.

SEVERAL SALIENT facts get lost in the widespread public empathy for the divested Bell operating companies. Each regional operating company will continue to serve between 70% to 90% of the population in its local franchised area, providing the necessary bottleneck control. Each will continue to operate in large, geographically contiguous areas — ranging from two states for the Pacific Telesis Group and 15 states for U.S. West — and in virtually all major metropolitan areas where most customer premises equipment competition occurs. In addition, alternate means to police anticompetitive behavior by the regional operating companies have proven inadequate.

Of all the unforeseen and unacknowledged consequences of divestiture and deregulation, perhaps none is as threatening to the future development of full competition as the revival of Centrex. In the Bell operating companies' multiple efforts to exploit Centrex service, with the acquiescence of policymakers at both the state and federal levels, the theory of workable competition has been carried to the ultimate. The potential victims are the competitive equipment suppliers and, ironically, the very policies on which the doctrine of workable competition stands — Computer II and the Modified Final Judgment.

Responding to the myth that the Bell operating companies are put-upon, state regulators are allowing the operating companies to freeze or reduce Centrex rates in order to stem the exodus of customers to technologically superior private branch exchange (PBX) and key systems supplied by competitive firms. Curiously, the residential user will be forced to pay to bail out large business and institutional customers of Centrex. But because the subsidies will be spread over such a large base of ratepayers, they are perceived as relatively painless.

The fear — that unless Centrex is protected now, the Bell operating companies will be unable to compete with AT&T and other giants in the new customer premises equipment markets of 1984 — is influential in efforts on Capitol Hill and at the FCC to reduce the new access charges for Centrex users. Centrex lines will be assessed at residential rates, not business rates, and the residential rates will be cheaper until 1989. The Bell operating companies are not satisfied to have their customers pay one-third the monthly rate that PBX customers will pay —

that is, $2 vs. $6 per line. As a result, the Bell operating companies and their user allies are pressuring the FCC to charge Centrex users the same rate they would pay if using a comparably sized PBX.

Such a regulatory sleight of hand ignores reality. Because their lines are bundled at the on-premises switch, PBX users require far fewer trunk line connections to the telephone company's central office than Centrex users require. As a result, customers make far less use of the telephone company's facilities and should pay lower overall rates. If the regional Bell operating companies are successful in creating an artificial rate parity between Centrex and PBX, any notion of cost-based pricing — so essential to the development of maximum competition — will be lost.

Several operating companies' attempts to add new features to basic Centrex service are equally ominous. These features include least-cost routing, call forwarding and storage and automatic call distribution. Some operating companies are contemplating the addition of energy management systems through Centrex. Such proposed expansions strike at the heart of the Computer II plan, which drew a fundamental distinction between basic, regulated service, such as local exchange and Centrex, and unregulated customer premises equipment and enhanced services. Similarly, the expanded Centrex offerings could contradict the Modified Final Judgment as well, because many of the proposed new features could be categorized as information services, which the regional operating companies are prohibited from offering without the explicit permission of Judge Greene.

To date, Judge Greene has not addressed the issue. And the FCC has failed to respond to requests to reaffirm the clear-cut distinctions of Computer II by prohibiting the Bell operating companies from illegally commingling regulated and unregulated services through Centrex. Such commingling, if allowed to occur, will enable the Bell operating companies to enter the competitive information services market through the back door under the rubric of regulated basic exchange service.

The result could be the remonopolization of local markets that the antitrust settlement and FCC deregulation policy were designed to eliminate. The threat would be not only to equipment vendors, but to the many independent data processing and computer-related support industries currently emerging.

The questions raised by Centrex, separate subsidiaries, inside wire and embedded customer premises equipment apply primarily to the telecommunications equipment industry. But the theory of workable carrier competition is being extended to the intercity transmission sector.

For example, consider Judge Greene's refusal to force the operating companies to allow customers to presubscribe to competitive carriers for intra-Local Access and Transport Area toll calls. This decision handed the local telephone companies what amounts to a $5-billion annual in-state market. Or consider Greene's acceptance of the Justice Department's separate consent decree creating a major new long-distance carrier through the merger of GTE Sprint and Southern Pacific's Sprint operation. The FCC, too, has begun a proceeding designed to explore the feasibility of deregulating AT&T's long-distance operation next year, despite the fact that it still has a 95% market share. Taken together, these three actions indicate that in the near future, the competition in the long-distance market could be confined to the giants.

The issues affect not just competitive equipment and transmission firms, but the entire telecommunications industry — users as well as suppliers, data companies as well as telephone companies. At stake is the further development of maximum competition in an industry stifled for too long by the domination of a single company. If AT&T is given carte blanche to dump its embedded customer premises equipment on the market, or if the Bell operating companies are allowed to stifle competition by denying free access to bottleneck premises wire, how much will have changed?

Or if the regional operating companies are given free rein to mix regulated local exchange and Centrex operations with their competitive supply of unregulated customer premises equipment and enhanced data products and services, hasn't the alleged purpose of divestiture and deregulation — to expand competitive markets — been undermined?

Will anything have changed if, instead of an integrated Bell System monopoly, we have a landscape composed of a dozen smaller Goliaths? Or will such an altered environment give new meaning to the old axiom: The more things change the more they stay the same? ■

Kramer is general counsel, North American Telecommunications Association, and a partner in the Washington, D.C. office of Wood, Lucksinger & Epstein.

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ISDN: THE COUNTDOWN TO PLUG-IN

BY FRANK GRATZER

Integrated services digital networks (ISDNs) are an important new means for telecommunications carriers to meet future digital voice and data transport needs. If they develop as planned, these futuristic networks will provide universal access to a wide range of business and residential communications devices.

Currently, individual voice and data transport services are offered to customers at specialized interfaces to different individual networks. For example, the circuit-switched telephone network carries voice or voice frequency data. AT&T's Dataphone Digital Service (DDS) provides private-line digital connections.

These and similar services provide valuable features. However, users are faced with different interfaces, protocols, access lines, error rates, reliability, maintenance procedures and a host of other changes when they use different services.

ISDNs are being designed so that a small family of customer/network interfaces can be used to support a wide variety of services. ISDN customer distribution equipment, such as local-area ▶

network gateways and private branch exchanges (PBXs), will integrate individual digital streams into a standard ISDN access stream (see Figure 1). An ISDN network interface would support simultaneous circuit-switched, packet-switched and non-switched services along with the associated signaling up to a maximum total interface speed. For example, proposed standard interface rates will include 192K bit/sec and 1.544M bit/sec. The user-perceived benefits of ISDNs will include stable, multipurpose interfaces; integrated access for a wide variety of services; and improved customer control over maintenance, network management and service provisioning.

The regional Bell operating companies are aggressively pursuing the installation of digital transmission and switching equipment that can provide the technical capability to offer ISDN services. Based on the anticipated Consultative Committee on International Telephone and Telegraph (CCITT) standards, public ISDNs should begin to be available between 1985 and 1986. CCITT study groups are working on those standards and are developing recommendations for approval in 1984. This work includes interface access types, performance, access arrangements, protocols, signaling, common physical interfaces and fundamental service elements. Users, manufacturers, public and private network providers, service vendors and terminal equipment manufacturers will all benefit by fully supporting these standards.

ISDNs are being planned to meet many different types of customer voice and data applications. These applications include meter reading, energy management, security, data base access and communicating word processors. They also include file transfer, facsimile, graphics, slow-scan TV, voice, bulk data transfer and eventually full-motion video.

For example, communications managers at major locations of large companies will want to transport simultaneously voice, inquiry/response data, facsimile and files. They will also want to conduct teleconferences among locations. Similar needs, but with a varying mix of applications, apply for smaller businesses and residences. In addition, to maximize the use of their facilities, users want to allocate their interlocation transport capacity among these different applications on a real-time basis as traffic needs change. ISDNs will allow this real-time capacity allocation.

Since ISDN applications will appear in a standard, digital format, the networks can be designed without knowing what the exact mix of future services will be. The public networks will be major providers of ISDNs. It takes many years to develop these large, ubiquitous networks. However, by having a target architecture that is robust to service forecast uncertainties, public network providers can confidently invest in ISDNs.

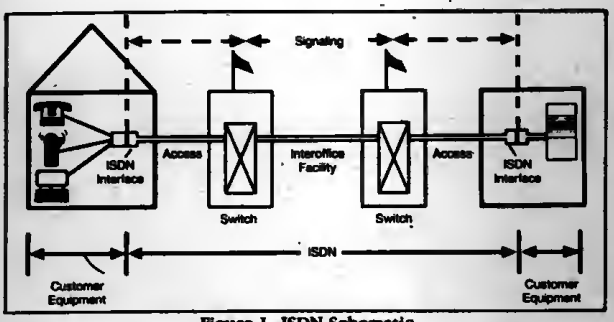

Figure 1. ISDN Schematic

Whatever individual services evolve, the basic ISDN transport capacity will be available to serve them all.

It is necessary to examine the basic architecture and attributes of ISDNs. ISDNs will provide end-to-end digital connectivity, clear channels, digital signaling, standardized interfaces, user control of bandwidth allocation and of some aspects of operation and access and service integration. These attributes are detailed below.

- *End-to-end digital connectivity.* Signals enter the network and are transported across it in digital form. They are delivered in this form to the distant user or to another connecting ISDN.
- *Clear channels.* Customers have full use of ISDN channels without restriction on bit sequence.
- *Access and service integration.* By means of a single access link, the user may access a range of network and vendor services simultaneously. The sharing of network equipment and its operation

across several services results in increased flexibility and reduced cost when compared with today's individual service-dependent equipment and operations.

■ *Small family of standard interfaces.* Only one interface will exist for a range of applications. A standard customer-to-network interface should result in a wide selection of ISDN-compatible terminals. The proposed standard ISDN interfaces allow independent evolutions of the network and of terminal equipment.

■ *Message-oriented digital signaling.* One of the fundamental advantages of ISDNs is message-oriented digital signaling. This will significantly impact existing voice and data applications. Message-oriented digital signaling provides faster call setup times.

■ *Customer control.* This allows a customer to allocate dynamically the capacity of the ISDN access link to different services and to select the network services desired. This is done in real time via customer-to-network signaling.

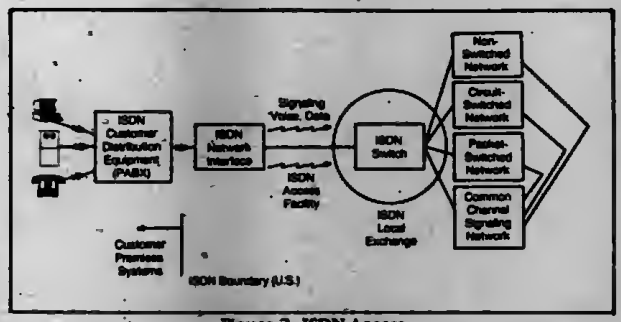

Figure 2. ISDN Access

The architecture shown in Figure 2 represents the first stage of ISDNs; access to the ISDN local exchange (switching office) is integrated, but the connecting transport networks are not. Customers perceive the system as integrated, since their network access is integrated. As technology progresses, the customer may not need to choose in advance between packet-, circuit- or non-switched service; the techniques may merge.

This merger might come through the development of burst switching or through fast packet switching. Both of these techniques take advantage of the characteristic bursts of voice traffic and the development of low bit-rate voice to switch voice and data at speeds of millions of bit/sec.

As part of their evolving communications networks, telecommunications companies and administrations in North America, Europe and Japan have been deploying increasing amounts of digital transmission facilities. They have also used space (analog) and time-division (digital) stored program-controlled switching systems over the past 20 years.

For example, in the regional Bell operating companies, the large majority of the metropolitan area transmission circuit miles are on digital carrier. The U.S., the UK, France, Canada, Japan, Italy and other countries have significant commitments to fiber programs and to exchange modernization through digital switching.

Digital systems have been used for growth and replacement of analog systems on a one-for-one basis in cases where the use of digital technology represented the less expensive alternative. The performance and operational advantages of digital systems have played a major part in economic considerations. The service opportunities offered by digital components and the motivating concept of evolving to an ISDN have only recently become major factors. ISDNs will be built based on this embedded digital technology, modifications of the technology and new technology specifically designed for ISDNs.

An important part of the developing CCITT recommended standards is the specification of ISDN network termination functions carried out in the ISDN line termination, the Network Termination 1 (NT1). NT1 is network-owned equipment on customer premises. It can provide network functions such as line termination, maintenance, testing, multiplexing and power feeding. The termination associated with NT1 is intended to provide a stable physical interface, independent of the transmission media employed. It is a key element in the ability of carriers to offer standard ISDN services.

ISDN standardized interfaces will encourage competition among network providers and among terminal equipment vendors, bringing substantial benefits to users. Competition will increase among terminal equipment vendors of all sizes, since no vendor can dominate the market

through promulgating de facto standards of their own choice.

A recent Federal Communications Commission (FCC) decision concerning DDS ruled that the channel service unit is actually customer premises equipment and not part of the network. The channel service unit is used to terminate the service and provides an access line terminating repeater, maintenance loop-around and signal conditioning. The FCC extended this ruling to include not only DDS, but all digital services. It implies that, in the U.S., digital services must terminate in bare wires or bare fiber rather than in the network channel terminating equipment chosen by the planners of public networks and by industry standards forums.

Unless it is modified, this decision would violate the preliminary international understandings already reached by CCITT on ISDN network interfaces. It would remove the NT1 equipment from the network side of the interface. The absence of this network termination would have serious implications for ISDNs. Rather than purchasing an ISDN standard terminal and being assured that it will work when plugged into an ISDN, a terminal with an integrated NT1 must be selected to match the specific loop transmission system being used.

The automated testing, provisioning and other operational procedures that must be part of feasible, economical ISDNs cannot be accomplished by public networks without some network equipment on customer premises.

Unless carriers are allowed to provide stable, well-specified interfaces without reaching into the domain of the user, the very concept of ISDNs is in jeopardy. Without this interface, carriers cannot guarantee the quality of the signal or the error rate to users under tariff..

But worst of all, the lack of a stable, well-specified ISDN boundary inhibits the ability of both the carrier and the equipment vendor to innovate separately and freely. If the customer's equipment has to be changed or modified to utilize any change in network technology, either substantial customer expense and inconvenience will occur or the carrier will be effectively precluded from utilizing the most economical and efficient technologies.

This discourages free and open competition among equipment vendors of all sizes, since terminals must be specialized to the specific technology used in a given network distribution area. ISDN terminals would lose portability, and small manufacturers would be discouraged from entering the market due to terminal specialization and nonstandard interface requirements. The interface defined for the customer must be independent of the facility and the maintenance procedures used to provide the ISDN service.

It is desirable for carriers, users and other interested parties to inform public policymakers that they want well-defined ISDN services, provided at clean ISDN interfaces. The technical flexibility in network termination equipment and in other aspects of ISDNs that the FCC and other public policymakers allow will be crucial to the success of public network ISDNs in the U.S.

ISDNs will be a driving force in bringing the benefits of the information age to business and residential users. The flexibility and standardized interfaces of ISDNs will allow public network providers to offer ISDN services in an economical, efficient fashion. They will also provide a procompetitive atmosphere for terminal equipment vendors and network providers, since they will have internationally accepted, rather than de facto, standards to meet. Users, vendors and carriers have a mutual interest in joining together to support ISDNs and ISDN standards. ■

Gratzer is technical assistant to the executive vice-president of the Central Services Organization, Basking Ridge, N.J.

OVERNIGHT MAIL SERVICES: HEADING FOR A COLLISION

BY KATHERINE HAFNER

In the dawn of 1984, the overnight mail delivery market never looked stronger. The six major couriers serving domestic and international markets move an estimated 1.2 million documents and packages every night.

Although they deliver only a miniscule amount of mail compared with the 328 million pieces handled by the U.S. Postal Service each day, the express delivery services guarantee what a 20-cent postage stamp cannot: next day delivery.

Once Federal Express Corp. originated overnight mail delivery in the early '70s, other companies followed suit to create a strong marketplace. Increased competition has led to diversification, and electronic delivery is becoming a crucial part of the picture.

Some of the couriers speak of finely tuned plans for introducing electronic delivery into their service line. Others, while acknowledging the increasing importance of electronic transmission and instantaneous messages, speak of no direct strategy for digital delivery. Still others refuse to speak at all.

Federal Express, the acknowledged leader in the domestic overnight delivery market, has spent nearly five years planning for this year's introduction of a facsimile-based, two-hour guaranteed delivery service. Known internally as the Gemini Project, the new service is targeted at the market for graphics-based, time-sensitive material such as architectural and other graphics designs and other legal documents.

The technology behind the bellwether company's electronic delivery service is on the cutting edge of innovation. The service is based around approximately 2,000 NEC America, Inc. Group 4 facsimile machines, which will be scattered throughout Federal Express' vast network of dispatch stations for document transmission via telephone lines and satellites at speeds as high as ▶

56K bit/sec or as low as 2,400 bit/sec, reproducing between 15 and 30 pages per minute. The resolution on the fax machines is very high at 400 line/in., producing a reproduction that resembles a high-quality photocopy.

Though Federal Express has yet to establish firm pricing on the service, industry analysts and others close to the project predict the average price for sending a 10- to 12-page document will be approximately $40.

HIGH-VOLUME Gemini customers will be offered attractive discounts with the option of leasing a machine from Federal Express and bypassing the courier pickup. If a customer is transmitting to someone else leasing a facsimile machine from Federal Express, then pickup and delivery is eliminated completely.

Federal's investment in the Gemini Project is substantial, at an estimated $100 million, and the company is the first to admit the project's high risk. The service is expected to be operational between April and July of next year, and whether or not a firm customer base will develop is anybody's guess.

"I don't want in any way to paint this as risk-free," James Barksdale, chief operating officer and executive vice-president at Federal Express, said. "There are many risks attendant with this move. But we think we've done our homework."

The much-whispered-about Gemini Project will face its share of competition.

DHL Worldwide Courier Express, with a predominantly international customer base, plans to introduce its own image-based electronic delivery service that would serve the U.S., as well as international markets.

DHL started 10 years ago in the San Francisco Bay Area as an international service, introducing its domestic service last year. Although reluctant to offer details on the new service, DHL President Larry Roberts explained his company's decision to address the same market as Federal Express.

"If you can produce high-quality scan documents, then you have a very effective service moving anything," Roberts said. "That's what Federal Express is undertaking with Gemini, and it's what we're working on doing."

Known internally as Electronic Image Transfer (EIT), DHL's service will be ready "sometime in 1984," Roberts said.

"Our service is similar in terms of its being a scan copy of copier quality," Roberts said. "In terms of document reproduction, it's based on the new generation of equipment being built now. We can move digitized pages and either copy it locally or remotely so we can send documents wherever we want."

Although he refused to say who manufactures the

Federal's investment in Gemini is an estimated $100 million, and the firm is the first to admit the project's high risk. It is expected to be operational between April and July, but whether a firm customer base will develop is anybody's guess.

machines DHL will use, Roberts acknowledged that the electronic delivery is based on fax-like technology with extremely high resolution.

And like the Gemini Project, DHL's EIT will be offered in a number of options, giving customers the choice of operating the machines on their own premises or through what Roberts calls "electronically augmented courier service."

"Perhaps in the U.S. it is correct to say it will come down to a matter of advertising," Roberts said. "But the worldwide coverage makes it far more important than saying it all comes down to a matter of advertising."

But the DHL service may have an advantage over Federal Express' offering. While DHL has already built a substantial international network, Federal Express is still in the early stages of branching out across the Atlantic, with electronic or any other kind of delivery. And while Federal Express' machines will compose a dedicated system, making them compatible only among themselves, the DHL machines will be designed to communicate with any other Group 4 machine.

Notorious for its clever commercials, Federal Express is planning a major $5-million publicity drive for Gemini immediately after the service is announced. Despite Federal Express' traditional marketing power, Roberts is optimistic about EIT's chances for success.

"Perhaps in the U.S. it is correct to say it will come down to a matter of advertising," Roberts said. "But the worldwide coverage makes it far more important than saying it all comes down to advertising. They [Federal Express] have some delivery [in Europe], but we cover virtually every country in the world in virtually every city."

AS FEDERAL and DHL spend 1984 fighting it out over the market for image transmission, the other couriers are taking noticeably less risk. Purolator Courier Corp., whose ubiquitous "Overnight, not overpriced" motto takes direct aim at its competitors, recently signed an agreement with MCI Communications Corp. The deal involves MCI's new electronic mail service — MCI Mail — and Purolator will deliver documents transmitted over MCI's electronic mail network overnight.

MCI Mail guarantees delivery of a standard-size letter or other document by noon the next day in most cities. This service costs $6, which is 30% to 50% less expensive than that of most overnight couriers. Purolator's agreement with MCI involves two levels of service: the four-hour delivery by courier within 15 metropolitan areas for $25 and the $6 overnight delivery.

"MCI has teamed up with Purolator because it is a traditional communications company with no physical delivery system of its own," according to Walter Ulrich, president of Walter E. Ulrich Consulting, Inc. of Houston. He consults for several courier companies. "It is an

advantageous arrangement for both of them: MCI can leverage on Purolator's physical delivery service, and Purolator can generate some good volume delivering documents for MCI."

"MCI has the technical background and knowledge; we have the courier network they don't have," Hollis McLoughlin, director of marketing services at Purolator, said. "We see it as an extension of our product lines, giving us greater customer convenience and different products to different customers." In addition, Purolator has announced a merger with DHL calling for DHL to deliver Purolator's international mail. And in turn, Purolator will deliver much of DHL's domestic mail using Purolator's vast domestic network.

With operation of the new scheme beginning this month, the "arm's length agreement" represents part of Purolator's "strategic plan to go worldwide," according to McLoughlin. "We have the most extensive coverage in the U.S., and they have the most extensive coverage outside the U.S. Crossing borders is an extremely difficult thing to do. DHL has, without a doubt, done a great job at it."

Commenting on Gemini, McLoughlin said, "I don't think the courier business is running scared at all. A lot of our business will not be affected. We carry computer parts, pharmaceuticals and machinery. Gemini can't do that."

According to Ulrich, arrangements similar to the MCI-Purolator agreement are likely to be announced between couriers and communications companies, but so far no other overnight courier firm nor communications company has disclosed such plans.

Other couriers in the overnight delivery business, including Airborne Freight Corp., Emery Worldwide and Flying Tigers, have no concrete plans for electronically based delivery of images, text or other documents.

A spokesman for Emery declined to elaborate on the topic. "We have nothing really germaine we can say," Robert Sykes said. "We're looking into facsimile or electronic transmission from an international standpoint, but we don't have any plans in the works right now."

Flying Tigers, a subsidiary of Tiger International, also has no specific plans to enter the electronic delivery market. Principally an air cargo carrier, Flying Tigers plans to remain that way, according to a company spokeswoman.

With annual sales in excess of $300 million, Airborne is also staying clear of entering a market fraught with risk and is investing in its existing shipping network instead.

"Gemini is a concern because basically it's a different means of transporting some of the same envelopes and documents we transport today. Obviously, that's a threat," David Billings, vice-president of corporate systems at Airborne, said. "We see ourselves as a proactive force in improving productivity in the company, reducing overall costs and enhancing our position in the marketplace."

Billings pointed to Airborne's on-line air-bill tracking system, a network consisting of over 400 CRT terminals and 200 printers, transmitting over 150 million char./day. "In this business, having an effective on-line tracking system is key to the company's success," he said.

According to Billings, by placing personal computers and terminals at customer sites, Airborne is providing its clientele with the ability to trace shipments, an important aspect of the company's dependability. "There is a very important role for technology in the more traditional air express market," Billings said.

"It is not necessary to look at the more exotic leading-edge offerings like Gemini to make a case for the effectiveness of technology in improving productivity and reducing costs to gain a position in the market," he continued.

"We don't feel that a dedicated type of investment like Gemini is the only way to serve the

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major shipper," agreed Paul McNerney, vice-president of strategic planning at Airborne. "We don't have a standard product such as a Gemini design. We are placing the pieces together for a paperless shipping environment."

And then there is the U.S. Postal Service, which carries nearly 300 times the volume of all the other carriers combined, yet cannot make the dramatic moves that are open to the private sector. "We're foregoing some market areas because people are saying we won't have a federal agency in that kind of business," Jim Van Loozen, a Postal Service spokesman, said.

The Postal Service's sole foray into electronic delivery is its Electronic Computer-Originated Mail (Ecom), which the Postal Service implemented in 1981. To date, Ecom has been a dismal failure, falling far short of its anticipated volume. The Postal Service has steadily lowered its initial projections of 50 million pieces of first-class mail generated via Ecom annually. The 1983 volume of 18 million fell about 28% short of projection, and the Postal Service has no plans to expand Ecom.

The Postal Service is studying a second type of electronic delivery called Electronic Message Service System (Emss). It is a long-range, multimedia project. The goal of the plan is to replace Express Mail for next-day delivery with 87 delivery sites by 1995. According to Van Loozen, however, Emss is still in the research and development phase, with no active plans for its implementation.

Whatever soothsayers are projecting as the fate for the physical documents delivered by the Postal Service, that governmental entity remains optimistic, even if seemingly in defiance of reason.

"Our feeling about electronic delivery is that it will indeed be a growing and increasingly important part of the communications marketplace," Van Loozen said. "However, we do feel that the assumption that the electronic age will take all our volume away is a gross overstatement. The same thing was said when the telegraph and telephone were invented." ■

Hafner is a staff writer for Computerworld On Communications.

BRIDGING THE HUMAN COMMUNICATION GAP

BY PATTI HARTIGAN

If a vital link in your communications system breaks down, do you ignore it, hoping the problem will work itself out? Of course not. You troubleshoot the problem, analyze it and do something to fix it. And afterwards, you take steps to make sure the problem doesn't occur again.

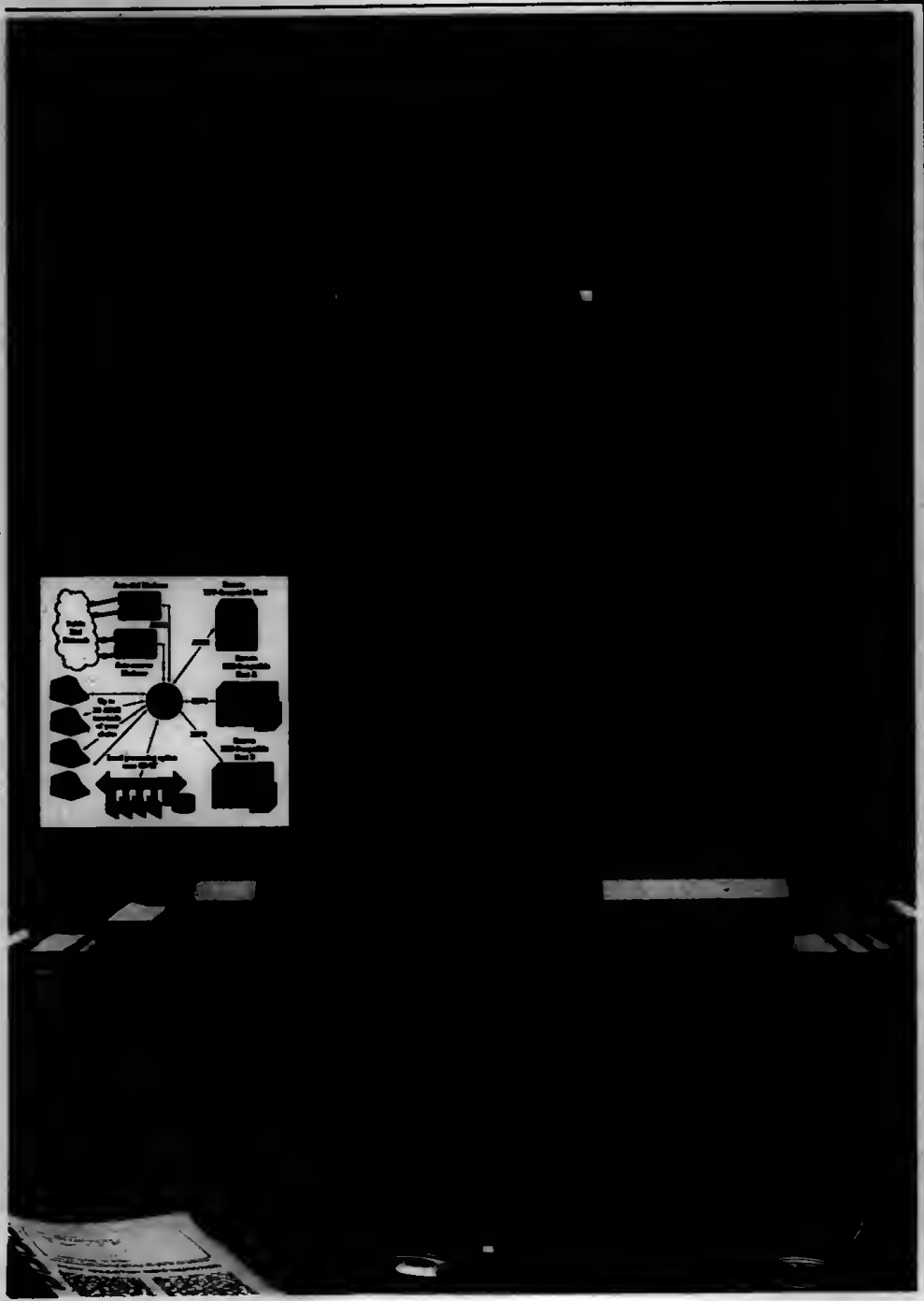
But what if the breakdown occurs in the oldest communication system around — the human communication network, a basic, essential system that is frequently taken for granted? Do you pinpoint the problem immediately or do days pass before you even notice something is wrong? And once the problem is recognized, how often do you say, "It's a personality conflict. There's nothing I can do to help; it will ▶

work itself out."?

The human communication network, like any other system, is composed of interwining parts that interact to achieve certain goals. It is not immune to bugs, nor is it self-perpetuating. Its components, like the terminal on your desk or the mainframe in your computer room, need to be monitored and maintained.

While most firms devote significant funds and energy to maintain their sophisticated communications machinery, how many make a conscious effort to improve human communication? It is especially important for data processing departments to work on communication, according to Marsha Sinetar, an organizational psychologist who heads Sinetar & Associates, Inc., a human resources consulting firm. "Most DPers went into the field because they like working with things, not people. It is rare to find one who is a natural communicator," she observed.

It is not enough for the company to sponsor an annual pig roast nor to cater an occasional cocktail party. And it requires more than a brand new coffee machine or muzak in the ladies room.



An effort to improve interpersonal communication involves more than simply flooding employees with information. "Management may send out newsletters, have audiovisual presentations and say, 'Aha, we have good communications.' That is communications with an 's,' but it is not communicating," said Peter Bugbee, who is a principal and communication consultant with the Boston office of Towers, Perrin, Forster & Crosby (TPFC), a human resources consulting firm.

It is not enough for the company to sponsor an annual pig roast nor to cater an occasional cocktail party. It requires more than a brand new coffee machine or muzak in the ladies room.

As a general rule, the human communication system is directly related to the firm's management philosophy. If management is tight — that is, employees are closely supervised, mistrusted, given little responsibility — it is likely that the interpersonal communication system will be strained and employee satisfaction will be low. Scott Myers, a management research consultant based in Santa Barbara, Calif., explained, "A company's annual report can say 'People are our most important asset,' but then the firm shows no respect for its employees, has them punch a time clock and so forth. This is not the way to establish open communication."

Myers continued, "A company must provide the opportunity for people to be creative, to get feedback and recognition and to achieve their goals."

This is easier said than done. The first step toward improving the human communication system involves recognizing that it is vital to the organization, that it needs attention in order to flourish. Pleasant working conditions do not exist miraculously — they are the product of time, effort and thought. "Communication is an area that always needs work," explained Judith Larkin, an industrial psychologist and psychology professor

This Consultant Holds Up the Mirror

No question about it — it's always the manager's fault.

That is how Marsha Sinetar, an industrial psychologist, wraps up interpersonal communication problems that arise in organizations. To Sinetar, the source of the problem is clear: "If there is a communication problem, apart from a new company or a company undergoing change, the problem stems from the manager," she said.

"I see the work group as a mirror," she continued. "If the group is resistant, it reflects resistance on the part of the manager. If it withdraws, it reflects a manager that avoids addressing problems. If the group is confused, the manager communicates in a confusing way."

Sinetar is president of Sinetar & Associates, Inc., a consulting firm that specializes in human resources planning, development and mediation. Unlike other consultants, however, she sees a simple solution to communication problems. "I simply hold up the mirror," she explained. "I don't

"I see the work group as a mirror," Sinetar said. "If the group is resistant, it reflects resistance on the part of the manager."

do training. People don't need more information; they just need to recognize that they are responsible for communication. They alone hold the answer."

It is up to the manager, Sinetar claimed, to change his own attitudes and the way he treats others. The manager must be the exemplar for his department. Sinetar, who has been in the consulting business for ten years, has a hard-nosed attitude. "I'm getting less and less sweet," she said. "If I am not hard on the managers, they won't take the responsibility."

Although she is somewhat draconian in her approach, Sinetar is optimistic about the possibility of creating a work environment where interpersonal relations thrive. "If a person ever worked in a place where things are fun, he never forgets it. It should be expected, but it's rare," she said.

"I worked for someone that cultivated that. Work was fun — like a Camelot." According to Sinetar, there is no reason why every office should not be its own miniature Camelot. The only thing that prevents this is a bad attitude, a selfish approach.

"I ask the team members to examine their own barriers. I don't encourage them to be critical of the manager, nor to damage other people. We don't attack, 'don't make others feel bad. We just simply communicate," she said.

The point is to recognize one's individual responsibility, to realize that change must come from within. "You cannot change other people, but you can change the way you treat them."

According to Sinetar, it's a matter of deportment. "People say that they want a formula on how to behave at work. What they really want is a formula so they won't have to behave." Sinetar stressed that managers must demand their employees to speak politely and have good manners. But managers must act that way too. They must expect to be treated the same way that they treat others.

Sinetar stressed that both managers and employees must be self-reflective. She listed three questions that every employee must ask himself in order to judge how well he is communicating. Employees must ask:

- How comfortable am I getting or giving a compliment?
- How well do I take criticism from my boss? From my employees? How well do I give criticism?
- How quick am I to give constructive criticism? Do I jump the gun and give it when it is unnecessary? Or do I wait too long, exacerbating the problem?

After the self-reflection has occurred, the rest is easy. "It's simply a matter of getting managers to manage, which is essentially to communicate," Sinetar said. "It sounds like I'm beating a dead horse, but we need only use what we have. It's so simple, if people would only realize that communication is a two-way process and they must contribute their part. If communication breaks down, it's no one's fault but your own."

at Canisius College in Buffalo, N.Y. "It's like a marriage. If communication fails, the marriage is more likely not to work. If the marriage fails, it is more likely due to a breakdown in communication than anything else," she said.

Some firms have in-house departments that specialize in handling employee relations. But many firms do not. There are, however, a growing number of human resource planning consultants and industrial psychologists that can help firms recognize, analyze and, in turn, solve their communication problems. The initial step, however, must come from within the firm.

According to Bugbee, "the request for assistance usually comes from the senior management group. Management notes a breakdown; there is always a trigger of some kind."

THAT TRIGGER CAN include symptoms such as low morale, general discontent, misinformation or confusion about one's role in the organization. In addition, symptoms can be as drastic as union organization attempts or massive walkouts. But it is absolutely vital to catch the problem before it gets out of control, and no company is immune to communication bottlenecks.

Breakdowns in data processing organizations occur within the department, but most frequently, between the department and the rest of the organization.

"With each other, DPers have few problems — they are a cohesive group, share their own language," explained Sanford Weinberg, an information systems professor at St. Joseph's College in Philadelphia. "They have a different vocabulary than upper management, however, and the two share a mutual disrespect. They use the vocabulary to hide what's going on." Breakdowns in communication, Weinberg maintained, stem from a difference in perspective. "DP is seen as having different goals than the rest of the organization," he said. "DPers are seen as a bunch of technocrats eager to centralize the system. They are viewed as empire builders."

But how do you bridge this perceptinn gap? Education, Weinberg claimed, is the key. "A successful tactic," the professor explained, "would be to give non-DP managers courses in computer literacy and to give DPers workshops in management techniques. They have to reach a mutual understanding." According to Weinberg, one way to sidestep the problem is to hire people with both business and computer knowledge. Several universities offer a degree in information systems, which focuses on those two different disciplines.

EXPERTS AGREE THAT employee involvement is an essential factor in opening up communication. Management must get everyone involved in the problem solving, be it by teaching simple computer skills to nontechnical employees, holding brainstorming meetings or conducting corporatewide surveys.

Management consultant Myers, who conducted definitive human relations research at Texas Instruments, Inc. in the '50s, gave an example of a firm that failed to involve all its members in a decision-making process. The firm, a client of Myers, planned to change its timekeeping system from a Hollerith punch card procedure to a keypunch time clock procedure. "They asked me what I thought, and my personal reactinn was that I didn't like it. It ties employees down, is inconvenient and shows a complete lack of trust in the employees.

"I advised management to consult the employees whose time was being recorded. As a result, the firm ended up with no machine at all, with employees charting their own time on the honor system," Myers said.

Granted, every case study is different, and there is no single solution to the human communication problem. But there are several things firms can consider when trying to improve their interpersonal communication. These include:

- ***Training and education.*** This can involve training in the importance of communication and in the development of interpersonal skills. It can involve computer literacy training for non-DP staff and management training for DP-related staff. In addition, employees can be educated on corporate history and policy, thus involving them more in their firm's operatinns and decisions.
- ***Job requirement and performance appraisal.*** Interpersonal comunication can be built intn a manager's job description. "If improving interpersonal communication is a specific job requirement, there is built-in reinforcement at review time," Bugbee pointed out. "For example, if someone does not work to improve human relations in his department, he doesn't get the same raise as someone who does. That's a strong way to reinforce a message: Dollars speak loudly," he said.
- ***Strengthen middle management.*** Special attention must be given to improving management's communication skills. Middle management is a vital link in the human communicatinn process. Bugbee explained, "It's like transmitting an electric current. It's strong at the source, but the further it travels, the weaker it gets. Communication is much the same way. The message is strong from the sender, but it gets distorted as it passes through different channels. It's up tn middle management to keep it strong thoughout the chain."
- ***Listening.*** According to Larkin, listening is vital to the communicatinn process but is frequently neglected. "Listening is where trust begins," she said. "If you don't listen, you dnn't understand problems."
- ***Self-analysis.*** Firms must identify their strengths and weaknesses and then analyze them and act accordingly. In addition, managers must look at themselves when trying to solve their firm's communicatinn problems.

Organizational psychologist Sinetar stresses the importance of self-analysis. "It is important for people to be self-reflective. The answer to communication problems lies with individuals," she explained (see related sidebar on Page 65).

- ***Corporate communication policy.*** With the help of a consultant or on its own, a company can develop a communication policy, a manual that spells policy out in black and white and that can be readily referred to if problems arise.
- ***Newsletters, audiovisual presentations and other media.*** While such media are important, it is necessary to remember that they only part of the solution.

Most consultants agree that a healthy interpersonal communication system is directly related to

success. Both Myers and Bugbee pointed to the firms described in the best-selling book, *In Search of Excellence*, by Thomas J. Peters and Robert H. Waterman Jr. These highly successful firms have one thing in common: They take pains to improve their interpersonal communication system, to create an environment in which employees can work toward their own goals while working toward the goals of the organization. "As a general rule, good communication is a direct correlation to success," Bugbee noted. "If you look at the successful firms, first and foremost, they have a good overall communication process. Communication is nurtured at these firms; it is cultivated."

Myers agreed: "Of course communication is related to success; that's why democracy is inevitable. It is no longer possible for an autocratic manager to run an organization. Any company ruling its people with an iron hand will have trouble surviving."

While it is vital for firms to open up their human communication system, how hard is it to change an organization that has been entrenched in a tight management strategy for years and years? According to Myers, there is one simple condition in which it can be changed: "When the pain of the malady exceeds the pain of going to seek help." It can be done, but it isn't easy.

According to Bart Perkins, a management consultant with Norton, Nolan & Co., a Lexington, Mass.-based consulting firm, it is necessary to "get the organization to unfreeze itself. Something must trigger the change, and once it is made, it must be refrozen."

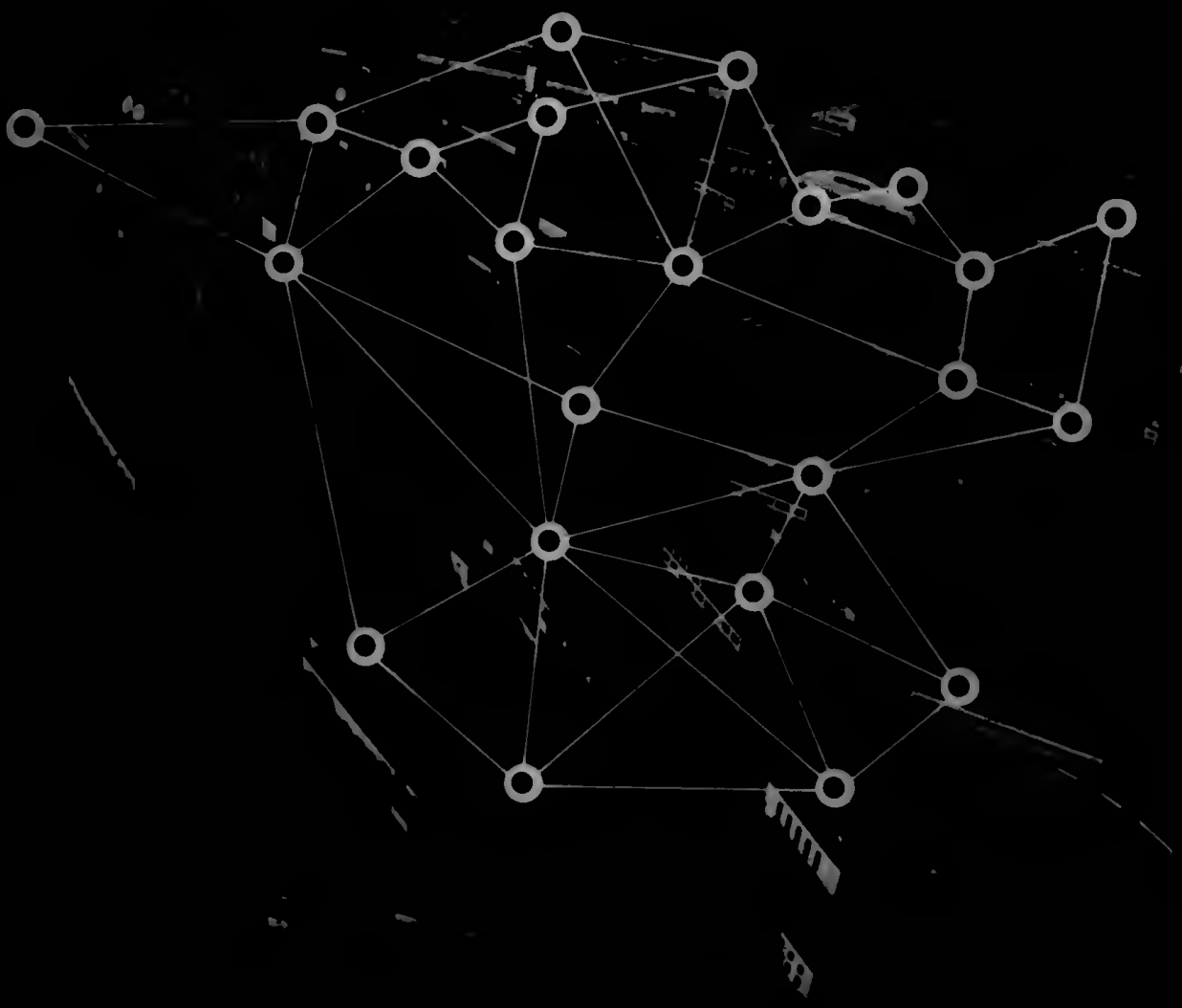
As a general rule, more and more firms are undergoing this "freezing process" and emphasizing the importance of interpersonal communication. "From my perspective, there is much more emphasis on communication skills — verbal and nonverbal," Bugbee explained. "Employers look closely at those skills, try to find people who can communicate. In the past, lip service was paid to it, but today it is becoming more and more important."

As companies realize the importance of human communication, they also become more aware of outside sources expert in the field. A word of warning, however, is necessary, according to Larkin. "There are a lot of fly-by-night outfits with packaged programs to apply to any situation — for example, time management. They teach you something that doesn't fit. They come in and promise the world, and they're not accountable. Some companies recognize this and are more selective," Larkin said.

Larkin also warned that companies must do more than talk about improving their interpersonal communication. "Most companies want to present themselves as progressive, but it's one thing to talk about it and another to do it. Communication is an area that always needs work. It's an ongoing process. You never get there: You can always do more." ■

Hartigan is managing editor of Computerworld On Communications.

According to Myers, there is one simple condition in which a long-entrenched tight management strategy can be changed: "When the pain of the malady exceeds the pain of going to seek help."



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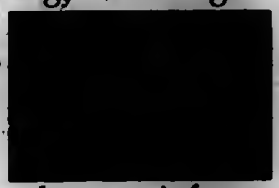
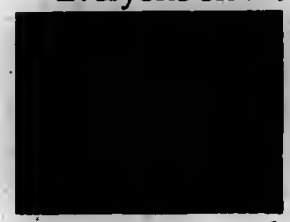


Everyone on the Ames network has access to almost every computer on it. Researchers share not only data, but software, utilities, and peripherals as well. A program written anywhere is often useful everywhere on the network, so there is practically no duplication of effort and almost no need to retrain users when new programs are added. The savings, in time and money, are substantial.



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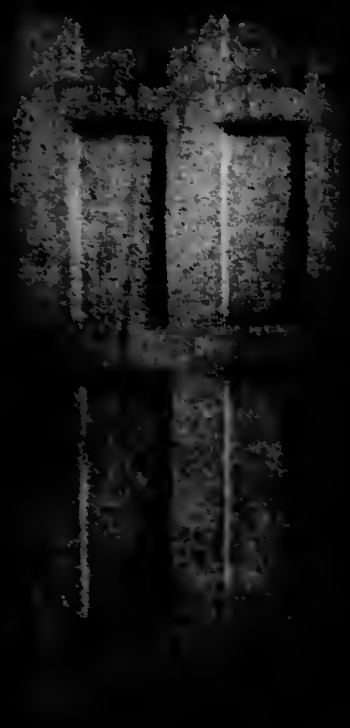

BLASTing

THE WAY TO SYNCHRONOUS COMMUNICATIONS

BY PAUL CHARBONNET JR. AND GLEN SMITH

Minicomputer and microcomputer users now have several new options in data communications software. Packages are available that provide the error-free computer-to-computer data transfer that was previously available only on much larger systems. These packages are inexpensive and require little or no additional hardware. Despite their low cost, some of them rival even mainframe products in their reliability, efficiency and ability to cope with new communications media such as satellite links and local-area networks.

Most of these packages fall into the rapidly growing category of file-transfer utilites — that is, programs that exchange files (binary, text or data) between computers. They even work among computers with previously incompatible operating systems such as IBM Personal Computer to Digital Equipment Corp. VAX, or Apple Computer, Inc. to Data General Corp.

The key factor in the development of these products is that most micros and minis have only asynchronous communications capability. They are equipped with the low-cost interfaces and 300 bit/sec or 1,200 bit/sec modems required for supporting character-at-a-time terminals and printers. They cannot use mainframe data communications protocols such as IBM's Binary Synchronous Communications (BSC), Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) and X.25 High-Level Data Link Control (HDLC) because these protocols require expensive synchronous interfaces and modems designed specifically for processor-to-processor communications.

Most of the new communications software for small computers is based on protocols that can operate with asynchronous interfaces and modems. Such products allow the small system user to integrate terminal and data communications in a single hardware environment. All of the asynchronous protocols that have emerged use the standard synchronous technique for error detection: The data stream is divided into blocks, and the integrity of each block is monitored by appending a check-sum that is recomputed and compared with the original check-sum when the block is received.

It is in the area of flow control and block acknowledgement that vendors of asynchronous packages have diverged on two distinctly different paths: full-duplex and half-duplex. For this discussion, half-duplex and full-duplex refer to the protocol structure rather than the electrical/hardware interface. Full-duplex protocols send blocks of data in both directions simultaneously, whereas half-duplex can only send blocks in one direction at a time, analagous to a two-lane highway and one-way street with constantly reversing direction.

Half-duplex protocols send a block of data, then wait for the remote system to return an ACK code (BLOCK OK, CONTINUE) or NAK code (BLOCK BAD, PLEASE RETRANSMIT). These are known as ACK/NAK or stop-and-wait protocols; full-duplex protocols are continuous. Communications software packages that ▶

use half-duplex protocols are widely available, since they are easy to design and implement, although inherently inefficient. Most are based on the Ward Christensen protocol, a half-duplex protocol in the public domain.

The inefficiency of stop-and-wait protocols results from the dead time between blocks while waiting for the ACK or NAK code to arrive. Any delay in the communications link adds to this dead time and typically cuts the efficiency of half-duplex protocols by 50% to 80%. Propagation delays are the obstacle both on satellite links and in packet-switching networks and local-area networks, in which the passage of data is momentarily delayed at each node in the network. With the growing use of satellite links and networks, half-duplex protocols are losing favor.

Full-duplex protocols such as Blocked Asynchronous Transmission (Blast) transmit a continuous stream of data blocks while using the other half of the communications channel to receive block acknowledgements simultaneously. This structure is combined with the use of sliding window or pipelining techniques as employed by sophisticated synchronous protocols such as SNA/SDLC and X.25/HDLC. The end result is that full-duplex asynchronous protocols can endure significant propagation delay without losing efficiency. They are suitable for use in a variety of communications environments.

Selective retransmission is a refinement of the sliding window technique that greatly improves performance on noisy lines. With this feature, only the blocks that have errors induced by line noise need to be retransmitted. Without selective retransmission, all blocks that have been transmitted since the bad block must also be retransmitted. This difference can account for as much as an 80% throughput difference on some connections.

Communications Satellite Corp. recently published the results of benchmarks comparing the performance of Blast with the half-duplex Christensen protocol on a satellite link. The tests involved two microcomputers exchanging files via 1,200 bit/sec modems on a dialed telephone call that included a single satellite hop. Blast consistently achieved 50% greater throughput than the Christensen protocol. Furthermore, the throughput of the full-duplex protocol remained high even when line noise was induced by deliberately off-pointing the satellite antenna.

With the AT&T deregulation and the financial problems facing the independent operating companies whose line maintenance costs will no longer by subsidized by Bell, deteriorating lines may continue to produce increasing amounts of noise to plague data transmissions. At higher modem speeds, line noise becomes an even greater problem. As modern technology provides faster and cheaper modems, the necessity of full-duplex selective-retransmission automatic repeat request to handle line noise also increases.

As line noise increases with aging telephone lines, so do the chances of spurious ACK or NAK bytes and telephone line dropouts that cause computers to hang or become locked up waiting for vanished bytes. Many systems have been carefully set up to transmit long files operator-free at 2 a.m., only to hang in the middle of a file due to a lost line and have to be restarted from scratch at 8 a.m. Most full-duplex protocols are immune to line dropouts and spurious data. In addition, the more advanced utilities provide a time-out mechanism that automatically recovers after a line loss and then retransmits from the point of interruption, rather than from the beginning of the file.

Bell's announcement that it will no longer guarantee terrestrial service instead of satellite links after 1984 is significant. The user never knows whether a telephone call will be routed via land lines or satellite. Either way, the data throughput will be higher with a full-duplex selective retransmit protocol.

Features common to the better full-duplex and half-duplex utilities include support on a wide variety of systems; error-free transfer of text and binary data; ease of use, including menu selection of features; and low-cost, software-only implementation not requiring special hardware.

Sophisticated utilities such as Blast also provide these features:

- Very high resistance to noise by using small transmit blocks and bit-oriented protocol.
- Ability to patch existing files without transferring the whole file.
- Record access or the ability to extract data from a remote file without transmitting the entire file.
- Completely implemented use of full-duplex capability so that transmission of different files can occur simultaneously in both directions making optimum use of full-duplex facilities.
- Status reporting while transmission is in progress.
- Ability of either end to initiate file transfer in either direction.
- True unattended operation.

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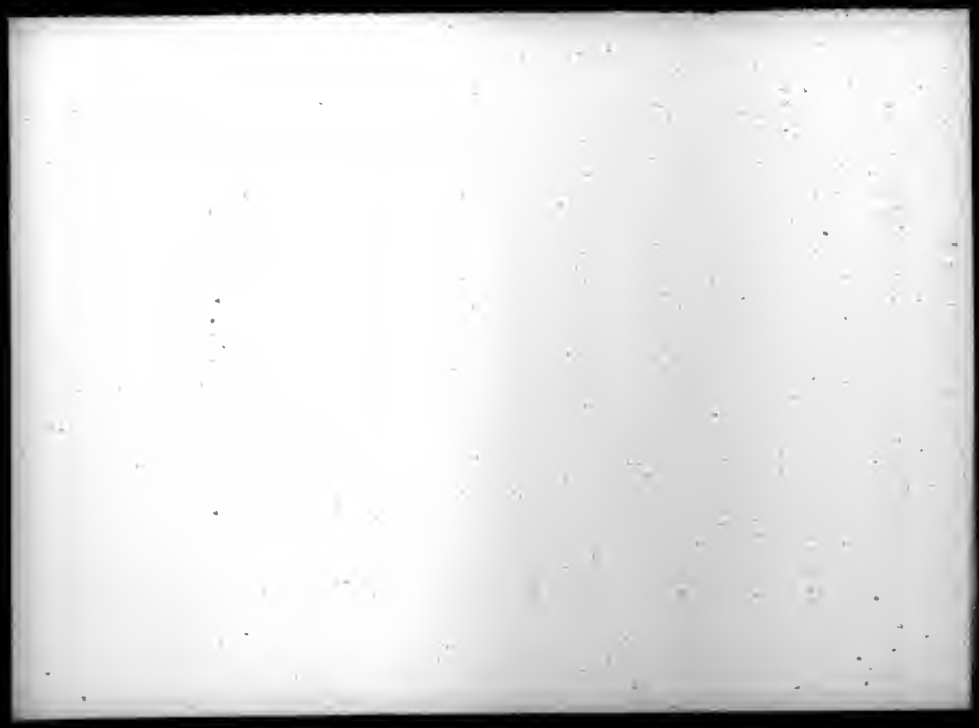

The more sophisticated file-transfer utilities also adhere to the International Standards Organization's Open Systems Interconnection reference model. In the interest of future compatibility between various systems, this model requires that communications products be logically and structurally organized on a layered basis. In particular, the software layer that performs the application-specific function — in this case, file transfer — should be distinct from lower layers that implement the error-free protocol. If it is necessary to translate from one protocol to another — for example, SNA to X.25 — the applications layer can remain intact.

A layered structure is also complementary to the hierarchical organization of many large computer systems. For example, in order to access mainframe application software, it may be necessary to go through a front-end processor, a software level that performs user log-on and validation and a software level that performs code conversion — for example, Ascii to Ebodic. Each of these levels can be addressed by a separate layer to the communications product.

Vendors of small computers have not been slow to recognize the emerging asynchronous technologies. Recent announcements by Data General Corp. and Televideo Corp. of their own Blast protocol products have generated substantial interest by other vendors in industry standardization. Packaged, ready-to-use versions of Blast are already running on over 50 models of computers, enabling full communications of any binary data, messages, text or commands. Blast products exist for systems from a variety of vendors, including Data General, Hewlett-Packard Co., Texas Instruments, Inc. and others. They are also out for most CP/M, CP/M-86 and MS-DOS compatible systems and for DEC VAX, Apple units (both DOS 3.3 and CP/M), IBM Personal Computers and for Unix systems. Half-duplex mainframes can accommodate full-duplex protocol in firmware attached to any asynchronous port on the mainframe. Any computer running such a protocol can thus talk to any other computer running that same protocol, despite operating system incompatibilities. The software package itself converts the text file formats to the format of the other system. With utilities such as these, only one program is required to talk to many different systems, as the protocol is the same, thus eliminating the awkwardness and expense of multiple programs for multiple systems.

There are certainly situations in which the small-computer user should opt for synchronous communications. The host configuration is the key factor when relatively few small systems are involved in communication with an existing host.

Host systems that already have multiple asynchronous terminal ports may not also have available synchronous ports. For these systems, asynchronous is the obvious choice. The reverse is also true for some large IBM mainframes that have only synchronous ports or that cannot support the overhead of CMS or TSO required to use the available ports asynchronously. For these systems, the more expensive synchronous additions to the smaller systems may be valid choices.

Data volume is a significant factor. Synchronous modems allow higher speeds on dial-up lines. Therefore, if large amounts of data must be transmitted dial-up, synchronous is preferable to asynchronous. Several manufacturers, however, are now marketing 2,400 bit/sec and 4,800 bit/sec dial-up asynchronous modems, and these are rapidly reducing the gap between the ability of synchronous and asynchronous products to handle large volumes of data.

Cost is also a significant factor. The cost of a utility such as Blast ($250 per CPU) and a 1,200 bit/sec asynchronous modem ($395 and up) is substantially less than the cost of a popular BSC package, 1,200 bit/sec synchronous modem and special synchronous interface for an IBM Personal Computer (approximatley $2,750 total). Other micro-to-mainframe connections are available in boards and protocol converters that typically cost around $1,000 per connection, plus modems. When many small systems are involved, the asynchronous alternative is clearly less expensive.

The emerging requirements for communications between low-cost computers can be served effectively without additional hardware by available asynchronous utilities using state-of-the-art protocols to provide sophisticated capabilites. They provide a means to use the common dial-up telephone lines, packet or local-area networks or satellite communications with high efficiency. As some of these protocols become de facto standards, they will provide mixed vendor communications capabilities similar to common synchronous protocols. ■

Charbonnet is director of marketing and Smith is vice-president, research and development, for Communications Research Group, Inc., Baton Rouge, La.

IS THE VOICE-DATA MIX MISSING?

BY JAMES N. BUDWEY

Up until about 1979, the development of voice and data communications followed somewhat separate courses. The characteristics of data communications were so different from those of voice communications that different system solutions evolved to satisfy each. For data, it was generally necessary to communicate between a mainframe or minicomputer and other computers or dedicated terminals. For the most part, these systems were used by highly trained technical individuals.

Data use was highly concentrated with long communications holding times. Terminals and communications lines were operated for long periods by users who worked in real time to design software programs at the terminals. User locations were relatively clustered and easily reached with coaxial cable. Therefore, communications transmission was accomplished via coaxial cable, dedicated-loop systems and dedicated point-to-point, point-to-multipoint cabling.

Local-area networks and switches evolved to provide nondedicated or switched data communications for these users. Transmission bandwidths required to support data communications were generally no more than 9.6K bit/sec from each terminal, but reached megabit rates in some special cases. In situations where low data rate remote access was needed, modems were used to couple through the local premises voice network. The systems and applications associated with data communications were tightly managed by a group of technically proficient data processing specialists who had their own organizations, budgets and languages.

In contrast, voice telephone communications was required throughout an organization for use by both technical and nontechnical people. Access was provided by wiring a facility with ▶

inexpensive, twisted copper wire pairs to all personnel locations. The bandwidth requirement for each voice telephone was nominally 4 KHz. This bandwidth was easily accommodated for long distances over the twisted-pair wiring.

Telephone conversations are short — usually about five minutes. Evolving telephone systems capitalized on this by providing only enough circuit paths to ensure that a user has low probability of blocking when phoning another station. As a result, all of the users do not have access to the system simultaneously. For these systems, about 50% to 60% of the users can simultaneously converse with each other at the same time.

In many cases, the organizational responsibility for managing the voice communications facilities became another of the facility manager's many responsibilities. Later, for larger organizations, this function was delegated to a professional telecommunications manager.

The telecommunications organizations were considered as overhead cost centers, and their expenditures and personnel were generally tightly controlled. Most of the people required to administer the system were telephone company employees whose fees were buried as part of the leased cost for telephone service from the telephone company. As private branch exchanges (PBXs) evolved, this scene changed slightly by requiring that more of the telephone administration burden be borne by the telecommunications organizations.

BEFORE 1980, voice and data integration was not a major issue and was accomplished by using modems to couple to the existing voice network. Because of the expense of modems and the limited bandwidth and capacity of the voice network, dedicated cable and loop systems were used. Totally integrated systems were not practical.

In 1980, a few integrated voice and data PBXs became available, and a small niche developed in the telecommunications marketplace. The users of such systems consisted of organizations with heavy data communications requirements, fairly technically oriented personnel and risk-tolerent managers willing to be pioneers in a new concept.

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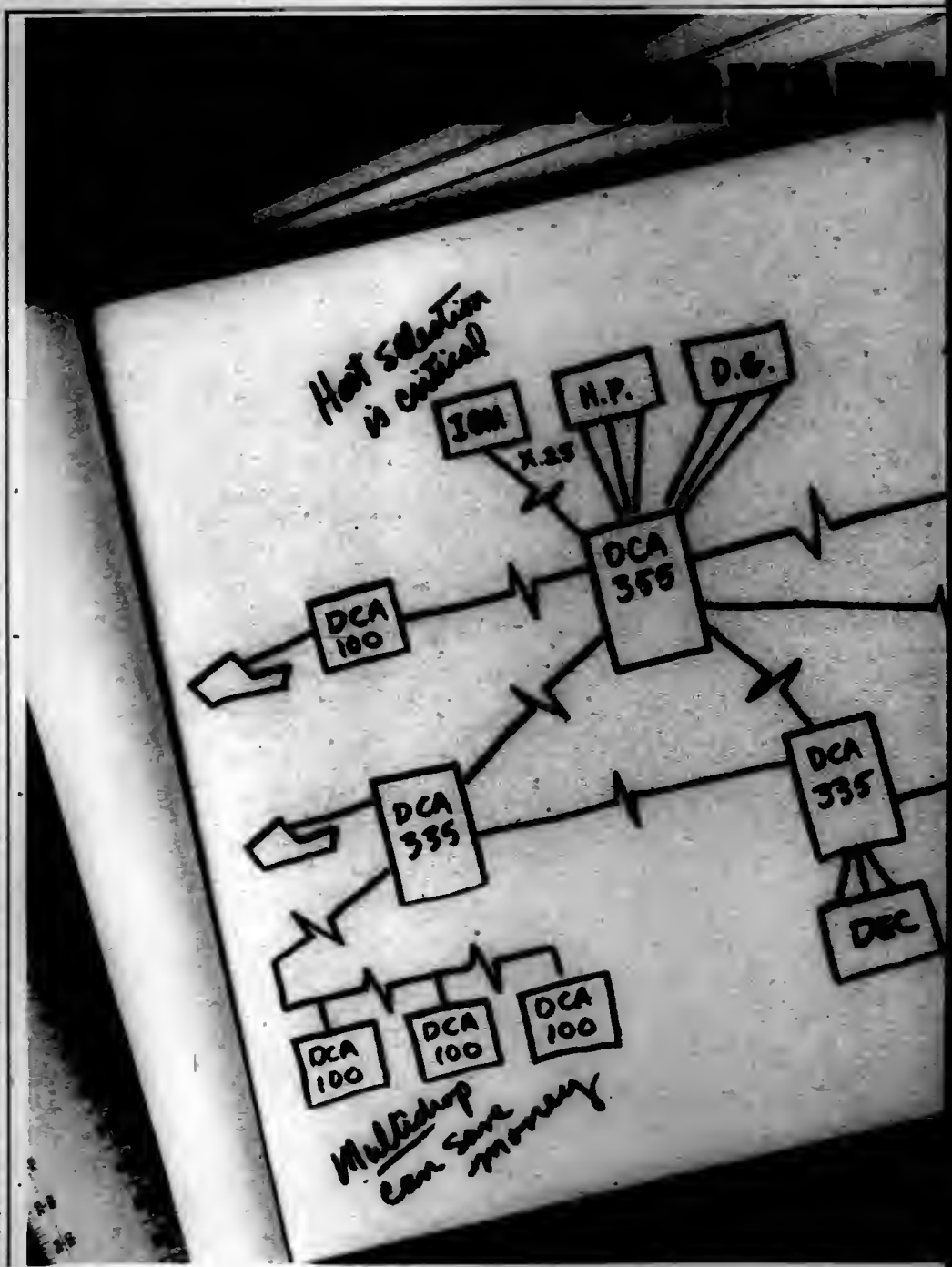
The PBX systems available at that time were considered expensive by the telecommunications managers who compared them with the voice-only systems. This raised serious questions about the viability of the PBX as the office controller. Local-area networks received much attention from the data-oriented groups, and separate communications solutions for voice and data appeared more practical.

Around 1980, the key factor driving the market for integrated systems was



beginning to emerge, namely the proliferation of data equipment and data-based essential services to nontechnical personnel randomly located throughout a facility or campus. These services require that data communications be ubiquitous, as voice communications is. In addition, as people are relocated, their voice and data communications capabilities must follow. Separate systems for voice and data in this environment would sorely tax the resources of the organization and be awkward to administer.

When systems are integrated, a single group of technical administrators can focus on the interface requirements and protocols necessary to provide communications between equipment from different manufacturers.

For example, duplicate sets of cabling would have to be strung to each location, one for voice and one for data, and existing conduits and ducts would have to serve many more cable runs from the separate voice and data organizations. Moreover, as moves or changes occurred, multiple groups would have to manage these moves, and multiple sets of cabling would have to be strung. In many cases, old cabling is simply abandoned and new cabling provided. This may seem to be a mundane problem, but many organizations are simply running out of conduit and duct space. It is expensive to add more to an existing facility. In addition, separate organizations and systems are not conducive to end-to-end integrated services.

When systems are integrated, a single group of technical administrators can focus on the interface requirements and protocols necessary to provide communications between equipment from different manufacturers. When properly implemented, the transmission requirements become transparent to the end user, and this stimulates more use.

Equipment and services requiring data communications to nontechnical personnel have begun to proliferate. A communicating word processor is an example of such a system. These word processors are currently penetrating the market at a growth rate of 15% per year. By themselves, however, word processors might not provide adequate justification for integrated voice and data systems, since they are being used for the most part by secretaries, who represent a small percentage of total personnel in an organization.

Other systems, such as electronic mail, personal computers and multifunction workstations extend the requirement for data communications to almost everyone. These systems are growing at annual rates of 25%, 20% and 50%, respectively.

YET THIS IS just the beginning. Off-premises networks that are available today promise access to a plethora of data-based information systems. Without this access, managers and staff members will be handicapped in the late '80s. Networks that provide end-to-end bandwidths of 1.54 MHz and

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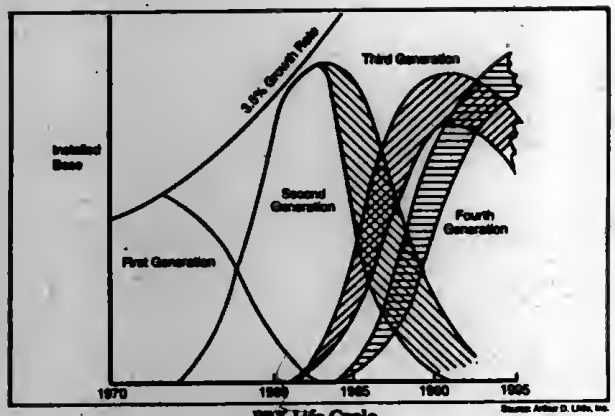

PBX Life Cycle

above, distance-insensitive satellite coverage and wideband fiber-optic networks will transport services, such as those provided by Source Telecomputing Corp., MCI Communications Corp., Compuserve, Inc. and others. In addition, essential proprietary corporate data bases, developed and controlled by management information systems managers and other corporate staff, will also be transmitted over these networks.

As a result of the rapid market penetration of many of these systems and services, the trend toward integrated voice and data systems is beginning to spread to the mass business market. Most corporate telecommunications and teleprocessing managers are aware of these trends and expect the percentage of users of these services to increase dramatically within the next five years. As a result, they are scrutinizing new system procurements to ensure that they are future-proof to the extent that they can modularly accommodate these emerging services.

Since 1980, when the first integrated voice and data PBXs were installed, the manufacturers and the industry have matured, and many major issues and trends in integrated services have come into better focus. Today, suppliers of integrated voice and data PBXs are emerging as strong contenders for the integrated office communications controller role. Systems available today — and many more announced for delivery in 1984 — will provide integrated voice and data communications at relatively low incremental costs for data. In addition, some systems provide transmission rates as great as 1M bit/sec and employ the best elements of PBXs and local-area networks.

THE INSTALLED BASE of PBXs and AT&T's Centrex business telephone lines represents the total potential market for integrated voice and data PBXs. By the end of 1982, this installed base amounted to over 20 million lines, with an overall annual growth rate of about 3.5%. The value of this installed base — assuming total replacement by PBXs in 1983 — is about $20 billion. The annual market resulting from a growth of this base and a replacement of older switches with newer ones was over $2 billion in 1982.

The installed base is currently comprised of several vintages of switching equipment. They include first-generation electromechanical and hard-wired electronic switches; second-generation centralized, computer-controlled, software-programmable, limited-capacity switches; and third-generation distributed processing, nonblocking, integrated voice and data switches with digital transmission capability from station to station.

The second-generation switches first appeared in 1975 when Rolm Corp. and Northern Telecom, Inc. introduced their CBX and SL-1 PBXs, respectively. These switches became popular quickly because they offered many convenient user features, ease of modification and upgrading and rapid payback. Shortly after Rolm and Northern Telecom introduced their switches, several other manufacturers introduced switches with similar characteristics.

All of these second-generation systems were designed mainly to provide voice-only communications, with all systems using analog transmission between the telephone set and the switch. Any switched data communication between stations required expensive

modems and was generally limited to data rates less than 4,800 bit/sec. However, advanced voice-related features, such as least-cost routing, call detail recording, networking and others, further enhanced the benefits of the PBXs and stimulated sales.

Because these systems were designed to handle voice traffic, with relatively short conversations, the long holding times associated with data communications occupy and hold internal circuits normally shared by several voice users. As long as the data stations represented a small percentage of the total, these systems offered adequate capacity. However, as the percentage of data users grew, blockages occurred, preventing additional users from establishing connections.

By 1981, hundreds of station and system features were available on these switches, and the list of manufacturers providing second-generation switches grew to about 20. Rolm and Northern Telecom introduced integrated voice and data upgrades to their second-generation systems, and Intecom, Inc. delivered a new third-generation PBX. The Intecom system, unlike its predecessors, featured a totally nonblocking feature capable of digital transmissions from station to station.

Even the voice signal was converted to digital form at the telephone. The system was also capable of distributing its switching equipment throughout a campus facility without degrading the features. This PBX was designed to accommodate heavy data communications requirements. Shortly after Intecom's product was released, Lexar Corp. introduced its own third-generation PBX, and other second-generation manufacturers began upgrading their systems as well.

In 1983, Ztel, Inc. and CXC Corp. both announced their fourth-generation systems using token-ring and Xerox Corp.'s Ethernet local-area network technology. They are scheduled for delivery this year. When these systems are fully developed, they will provide third-generation features in addition to advanced features such as distributed and layered software with functions that can be reallocated to various processors and station data rates that can be instantaneously increased to more than 10M bit/sec.

Integral local-area network technology is featured, and Ztel is offering a baseband token-ring system said to be compatible with IBM's still unannounced local-area network. CXC offers token-ring and Ethernet compatability with a combined baseband and broadband system. Both systems promise time division multiplexing/post code modulation circuit switching and packet-switching capability, open system architecture, protocol conversion, high-level software languages, X.25 and T-1 interfaces and excellent modularity.

In 1983, Ztel, Inc. and CXC Corp. both announced their fourth-generation systems using token-ring and Xerox Corp.'s Ethernet local-area network technology. They are both scheduled for delivery this year.

In addition, Northern Telecom announced its "Open World" development program, which promises compatibility be-

tween various data processing and office equipment products. AT&T announced its System/85 integrated voice and data PBX. Intecom also announced IBM 3270 protocol converters.

One of the major questions plaguing voice and data integration has been end-user prices. In 1979 and 1980, incremental prices for adding data ports to the voice network exceeded $1,500 per port. This price has dropped significantly. Currently, the incremental, end-user price to add data ports falls between $400 to $600 per port. The price reduction is due to significant equipment redesigns to accommodate data better and due to increased competitive pressures.

The trend is clearly set. The industry will continue to move toward integration of voice and data communications. And the number and usefulness of data-based services from public sources and internal corporate sources will increase.

The trend is clearly set. The industry will continue to move toward integration of voice and data communications both in on-premise and off-premise networks. At the same time, the number and usefulness of data-based services from both public sources and internal corporate sources will increase. More people are expected to depend on electronically delivered information.

Prices for integrated systems will continue to drop, with the incremental price to add a data port to an integrated voice and data PBX expected to reach $200 or less by 1987.

There will be a continual migration from the older generation systems to the newer systems. In the same way that second-generation switches replaced the first-generation switches, third- and fourth-generation switches will eventually dominate the market. The figure on Page 80 shows the life cycles of these systems over the next decade. The shaded areas of the curves represent the estimated extension of product life resulting from the upgrading of older generation switches by adding advanced generation features.

Centralized data processing, telecommunications and office equipment organizations will develop within end-user organizations in most industries. These organizations will assume the responsibility of integrating voice and data requirements, coordinate procurements and administer the system operations.

Suppliers will provide total packages including integrated voice and data communications and specialized application packages. New alignments will occur between distributors and manufacturers of telecommunications, data processing and office equipment.

These will provide end users broad product portfolios and application packages encompassing all of these technologies.

The issue of separate or integrated voice and data systems will dissolve, and new issues will replace it. Issues such as bit-rate capacity, protocol compatibility with other equipment and networks and user friendliness will continue to be important end-user buying criteria. ■

Budwey is a senior consultant with Arthur D. Little, Inc., Cambridge, Mass.

TOM WILLMOTT
& JOE PIERCE SR.

The Emerging Telecom Director

Currently, two impressive information processing trends are emerging. First, microprocessor-based systems now permit the distribution of computing power throughout every large organization, placing new emphasis on the end-user liaison role in the management information systems (MIS) group in general.

Second, the distribution of processing resources implies that these dispersed workstations and computers must communicate for maximum effectiveness. In many large corporations and government agencies, this subtle inference has focused attention on job descriptions relating to communications. Clearly, communications is the hot MIS job responsibility in the country today.

Nevertheless, interviews conducted by International Data Corp. (IDC) indicate that the availability of top-quality candidates for this position, especially in certain geographic locations, is almost more important than the money available to fund the requisition in an MIS budget.

There is a limited pool of communications management talent. Sometimes existing communications personnel have experience in voice, but not data, or in data communications, but not business management. In the area of private branch exchange (PBX) selection, for example, it is possible that a PBX purchased two years ago was acquired by a member of the organization's administration, rather than by MIS. This is simply because the voice communications manager did not report to the MIS group.

Historically, there have been three stages in the development of the communications function. In the first phase, which occurred in the '60s, the computer facility processed batch applications, and the communications function consisted primarily of terminals and peripherals hard-wired to the CPU.

In the second stage, which emerged from the installed base of minicomputers in the '70s, the communications environment was defined by leased telephone lines to remote sites for remote job entry applications and batch data file transfers. The communications function was critically important, but the job description was relatively limited in scope of opportunity.

Now we are entering the third stage — the age of networks. Communications is a value-added application, available on almost every conceivable microprocessor-based device, including word processors, personal computers, printers, copiers and scanning devices.

The problem from a technology management perspective is to define the optimum network for the organization. Perhaps every device does not need to communicate. Assumptions about critical business information and high-volume traffic links must be made in order to develop successful network strategies.

ILLUSTRATION BY BOB DAVID

Because the scope of the technical work has grown so dramatically and because the AT&T divestiture has only recently arrived at a moment of truth, few companies have had the luxury of devoting a full-time staff to long-range communications planning. Recruiting new talent has proven difficult and expensive.

When the perspective of the few local qualified candidates seems too narrow to help the organization draft a plan for sophisticated future systems or when there is simply no one from the outside with a good business management sense, it may be necessary for the information systems planning department to groom young, talented staff members for promotion to the new job descriptions.

IDC has isolated several major areas of responsibility pertaining to this expanding field. In the following sample case, we have structured the department with a director of telecommunications policy. The managers of telecommunications, office communications and network control report to this director.

It should be noted that the model is not a total solution for every organization, but it does offer a simple checklist for comparative purposes. The director's numerous responsibilities are outlined below.

The incumbent director of telecommunications policy will be responsible for the general coordination of communications systems and requirements, both voice and data, within the corporation. This includes the responsibility of managing data processing traffic and all office communications through the corporation's telephone systems.

In addition to the general duties described above, the director of telecommunications policy should be a member of the information resource planning board within the corporation. As such, he will be expected to formulate long-range forecasts of communications needs so that the corporation can better meet future demand. It is expected that the director of telecommunications policy will work with the director of data processing policy. Both report to the vice-president of information systems.

Although a heavy technical background is not mandatory, an ability to select and nurture technical managers is necessary. In addition, a college degree with at least 10 years of increasing supervisory and management experience in the data processing and/or telecommunications field is required.

The position is at the officer level with a salary range of $55,000 to $70,000 per year. In addition, the director of telecommunications policy reports to the vice-president of information resources.

There are several primary areas of concern beyond those specifically outlined for the director of telecommunications policy. First, he is responsible for telecommunications, defined as all voice and data traffic outside the corporate headquarters building. For example, he is responsible for liaison with AT&T Information Systems or bypass carriers, in coordination with PBX suppliers and the corporate office communications group.

He is also responsible for the installation of data lines within the corporation — for example, lines to remote terminals and lines between data centers.

Second, the director is responsible for office communications. His duties here include voice-only and internal-to-corporation communications. He manages office moves and telephone number changes. He is responsible for PBX analysis, least-cost routing and station message detail recording tracking. He is the liaison to finance.

This job might also focus on the key issue of the role of PBX in local-area network and local data traffic strategy. This assumes contact with end users and perhaps analysis of new low-end data and voice terminal products. The director is responsible for modems, coder/decoders and other options.

Third, the director of telecommunications policy plays a role in network control. He is responsible for troubleshooting and maintaining communications software packages, such as Vtam and Btam in IBM environments.

The director's duties include assessment of other issues, including migration from IBM Binary Synchronous Communications to Systems Network Architecture/Synchronous Data Link Control, market trends and network security. Node and link capacity planning also fall under this heading.

In addition, the director of telecommunications is heavily involved with DP strategists. He interacts with them in such areas as selection, installation and maintenance of sophisticated data switches.

From our market research and consulting perspective, these are the areas evolving as major topics of concern. Obviously, it will be difficult to fund or staff all the assignments on our sample chart immediately. However, we do recommend that the technical areas be covered in the electronic data processing planning group. This sample case can be used as a fundamental benchmark for your communications planning. ■

Willmott is director, user research, and Pierce is senior consultant, communications, IDC, Framingham, Mass.

Can you answer these questions on local area networks the way you would have two years ago?

1. Is broad *versus* base band still an important issue?
2. Will local area networks and PBXs co-exist, be mutually exclusive or will one be subservient to the other?
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PRO & CON

ISI vs. Intelsat: Will ISI Stay Grounded?

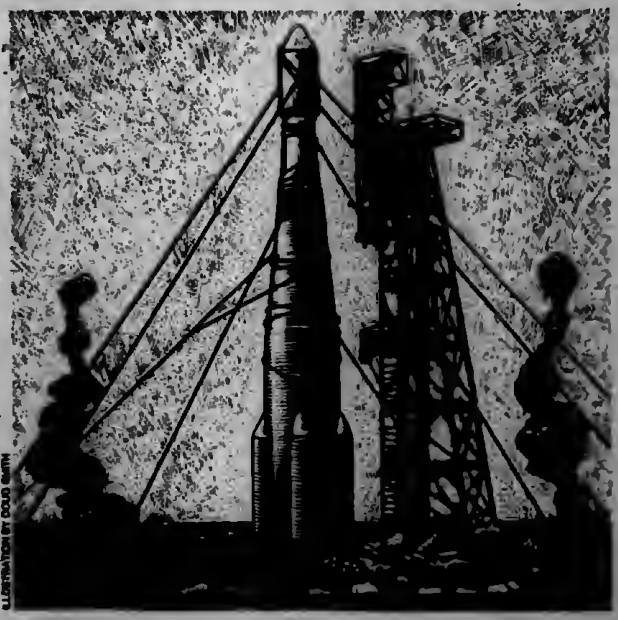

ILLUSTRATION BY DOUG SMITH

The current disagreement between International Satellite, Inc. (ISI) and the International Telecommunications Satellite Organization (Intelsat) stems back to 1962, when the Communications Satellite Act became law. The act called for the establishment of a single global satellite system. In February 1963, Communications Satellite Corp. (Comsat), a publicly owned private corporation that provides international and domestic communications services between the U.S. and foreign points, was formed as an outgrowth of the act. Intelsat, the vehicle for the global satellite system, was spawned on Aug. 20, 1964.

Today, Intelsat is comprised of 108 member countries, with Comsat as the U.S. signatory. Intelsat's global network transmits and receives telephone, teletype, data, facsimile and television communications, touching 172 countries and territories around the world.

On Aug. 12, 1983, ISI filed an application with the Federal Communications Commission, proposing to launch two satellites to provide the North Atlantic region with communications services — primarily in video distribution and data communications. Intelsat objects to the application, claiming it violates the Communications Satellite Act's commitment to Intelsat's "single global communications system."

ISI recognizes Intelsat's achievements, but argues that the 1962 act allowed other systems to be established "if otherwise required in the national interest." ISI claims that it will fill voids in video distribution and high-speed data and that its plans are in the national interest.

Computerworld On Communications *asked Comsat and ISI to recount their arguments for or against the application.*

PRO

International Satellite, Inc. (ISI) was formed to develop new satellite communications markets and services in the North Atlantic region. The principal participants in ISI are TRT Communications, Inc.; Satellite Syndicated Systems; and Kansas City Southern Industries, Inc. ISI has filed an application with the Federal Communications Commission (FCC), in which it proposes to construct, launch and operate two in-orbit Ku-band satellites that will be located at 56 degrees and 58 degrees west longitude.

From these orbital locations, ISI will be able to serve the entire continental U.S. as well as most of western Europe using customer premise, small aperture earth station antennae that will allow customers to transmit and receive signals directly with the satellite. ISI expects to serve primarily the video distribution and data communications markets.

The impetus for the creation of ISI was the conviction that Communications Satellite Corp. (Comsat) and International Telecommunications Satellite Organization (Intelsat), for all their unparalleled achievements, were neither adequately meeting nor even planning to meet the international satellite communications needs of the U.S. private sector in the North Atlantic region. About 85% of Intelsat's traffic and revenues come from the provision of ordinary voice telephone circuits. Despite a recent gradual widening of the scope of Intelsat's services, in ISI's view, there is still a need for more communications services and arrangements in the private sector. These services must extend beyond the traditional leased voice services on which Intelsat has concentrated.

ISI believes there is a substantial need for video program distribution services and, to a lesser degree, high-speed data. Specifically, such services need to be provided in a configuration that offers rooftop-to-rooftop capability — for example, one satellite hop from origin to destination. These services must also offer full continental U.S.-to-Europe coverage, full redundancy of equipment in the event of a facility failure and private user ownership of the facility. ISI plans to sell at least 50% of the spacecraft directly to users, reserving 15% to 30% for common carrier service at tariffed rates.

The ability to provide a direct link by satellite for customer location to customer location will substantially reduce the cost to wideband users: Double hops or lengthy land-line extensions can be eliminated. Moreover, by offering space segment capacity with unique capability at competitive rates and on innovative terms, ISI believes it will stimulate new regional satellite uses that would otherwise not be developed or would be delayed. The ISI proposal also advances important U.S. goals with respect to national security communications and trade in telecommunications services. It helps to assure that an independent regional satellite system in the Atlantic region is of U.S. origin.

ISI believes that its proposal will be beneficial to all concerned. This includes the U.S. private-sector user of telecommunications, the public domain that will invest in ISI and even the existing providers of international satellite services whose best competitive instincts have been allowed to lie dormant for too long.

ISI's proposed system offers

(Continued on Page 86)

CON

When the Communications Satellite Act became law in 1962, the U.S. committed itself to establish a global commercial communications satellite system. The act's goals are far-reaching and ambitious: to provide service to less economically developed countries, to use the electromagnetic frequency spectrum in as efficient and economical a manner as possible and to ensure that the benefits of the new technology are reflected in both quality of service and charges. For close to 20 years, Comsat and Intelsat have been achieving these goals.

Today, Intelsat is an internationally acclaimed political and commercial success composed of 108 member nations. It owns and operates satellites over the Atlantic, Pacific and Indian Ocean regions, carrying two-thirds of the world's international telecommunications traffic and all of its international television transmission.

Some 172 countries and territories around the world use the Intelsat system through 165 earth stations located on tiny Pacific islands, in the tropics of South America, the mountains of Asia and wherever there is a desire to communicate with other nations. In addition, 28 countries have used Intelsat to establish domestic communications networks bringing remote communities into the mainstream of their nation's activities.

The U.S. was the principal sponsor of Intelsat, and through it, the U.S. has assumed and maintained a leadership role in extending the benefits of modern satellite communications to all nations. Over the years, Intelsat has also provided a cooperative commercial mechanism for the development, utilization and management of scarce orbital arc and frequency spectrum resources.

At the same time, Intelsat has enabled the U.S. to obtain reliable and economical global communications services without relying on systems in which it has no representation or control.

Given this background of Intelsat's unequivocal success and benefits to the U.S., it is ironic that the U.S. has become the focal point of efforts to undermine the successful continuation of Intelsat's operation of a global commercial satellite system.

Recently, certain applications have been filed with the Federal Communications Commission proposing systems in competition with Intelsat. These applications contend that the Satellite Act leaves open the possibility of creating additional communications satellite systems. However, the act specifically permits creation of additional communications satellite systems only "if required to meet unique governmental needs or if otherwise required in the national interest." This language unequivocally makes it necessary for the proponents of any other system to prove that overriding national interests exist that require a separate system.

The proponents of these competing systems have adopted a dangerously casual approach to the application of certain articles of the Intelsat Agreement. This agreement requires all members, prior to establishing space segment facilities that are separate from Intelsat, to consult Intelsat to ensure that the separate facilities do not interfere technically with the Intelsat system and do not result in "significant economic harm" to Intelsat.

(Continued on Page 87)

PRO

Continued from Page 85)

many advantages. It advances U.S. procompetitive policy, creates new markets, introduces new services, expands technological and price competition, offers flexible ownership or lease arrangements, advances U.S. policy on orbital resource allocation and provides diversity and emergency communications capability for the U.S.

ISI fully understands that its proposal raises important public policy issues. These issues turn on the meaning and intent of the Communications Satellite Act of 1962 and the provisions of the Intelsat Agreement. Both have crucial foreign policy dimensions.

Opposition to ISI has arisen from Comsat and Intelsat. Their opposition is based on the contention that approval of ISI would be a radical departure from the U.S.' historic commitment to the single global system.

The U.S. commitment to Intelsat must be properly understood. It is not unconditional; it is not exclusive; it is not inflexible. The telecommunications environment has changed dramatically since the international community adopted the Intelsat concept. More than half of Intelsat's member countries are participants in — or are actively studying participation in — regional communications satellite systems.

It is critical that U.S. policy adapt itself to the new environment in which Intelsat has emerged as a strong, successful institution. This certainly does not mean Intelsat's global mission is at an end, nor that it no longer has a vital role. It simply means that Intelsat must take a more flexible stance in which its institutional purposes and needs are complemented by those of other organizations.

The Communications Satellite Act of 1962 provided Comsat with a unique mandate to represent the U.S. in a "single global satellite system." At the same time, the act also provided that other systems could be established, if required, in the national interest. Intelsat, through its executive organ, has argued that U.S. approval of ISI would be inconsistent with the U.S. commitment to Intelsat because such approval would destroy or seriously wound Intelsat. The nonbinding standard to which the U.S. agreed is the avoidance of "significant economic harm" to Intelsat.

Keeping these coordination procedures in mind, ISI's application showed that ISI would not cause significant economic harm to Intelsat. In fact, ISI showed that over a period of seven years of operation, it would have a cumulative revenue impact of 3.18% on Intelsat, or a little over .5% a year. ISI noted that Intelsat has been growing at the rate of 15% to 20% a year, so a .5% annual impact would account for about two weeks' growth. Neither Comsat nor Intelsat has even attempted to refute ISI's economic assertion.

Intelsat claims that ISI will yield the benefits of the heavy North Atlantic route, weakening Intelsat so that it will have to raise rates or reduce service for the thin route countries in other regions of the world. There are many logical difficulties with this argument. Intelsat has not shown that the North Atlantic routes subsidize their thin ones. The only serious attempt to study the matter reached the opposite conclusion. The study was conducted in the summer of 1983 by Dale N. Hatfield Associates, a private consulting group, in support of the Orion Group application to the FCC.

It has been suggested that if ISI is allowed to proceed, precedent would be established and many other systems would be proposed. It is argued that Intelsat's future would be threatened by the large number of regional systems proposed. ISI has no way of predicting whether such a cascading effect would occur. ISI sees no reason why this speculative result should pose substantial dangers for the U.S. If the international community wishes to proceed in that fashion, the U.S. could not prevent it and might be better off on balance for the reevaluation.

The Intelsat system currently in place has served the U.S. and the rest of the free world well. ISI does not wish to undercut Intelsat. Approval of ISI does not signal any change in the U.S. commitment to Intelsat. It is, in fact, well within the clear parameter of the U.S. commitment. Certainly, the U.S. has not agreed to disregard its own national interest. No U.S. foreign policy objective would be impaired if Intelsat were to evolve gracefully away from the role of monopoly satellite communications supplier in the North Atlantic to a role that is complementary with that of other systems serving various regions.

A reassessment of the international satellite arrangement is healthy; the introduction of competition will lead to sharper, more innovative and creative planning and marketing within Intelsat and in the various regional systems. ■

(Continued from Page 85)

Moreover, the contention that these other systems would offer services not currently available from Intelsat — specifically identified as switched message service, telex, video and digital communications — is simply incorrect. These services are either presently available or they are in the process of being implemented as standard Intelsat offerings.

With the initiation of its new International Business Services, Intelsat will be able to provide a flexible, totally digital, globally interconnected service. This service is expected to be designed to accommodate a full range of user applications. These will include such applications as telex, voice facsimile, data and teleconferencing.

Some 172 countries and territories around the world use the Intelsat system through 165 earth stations located on tiny Pacific islands, in the tropics of South America, the mountains of Asia and wherever there is a desire to communicate with other nations.

Most importantly, however, the establishment of separate systems would amount to a total reversal of U.S. policy towards Intelsat and would seriously harm U.S. foreign policy interests. The director general of Intelsat has expressed grave concern regarding the diversion of transatlantic traffic by a separate international system. In addition, the two highest governing bodies of Intelsat, the Meeting of Signatories and Assembly of Parties, have expressed similar concern.

This concern was expressed in a resolution, which was endorsed without dissent by 70 countries at the Intelsat Meeting of Signatories last April.

This same concern was also voiced at last October's meeting of the Intelsat Assembly of Parties. This meeting was attended by senior government officials from 80 nations.

Approval of these proposals would be perceived around the world as a U.S. effort to use the limited resources of the orbital arc and the radio frequency spectrum inefficiently. It would greatly exacerbate existing international tension over claims to access these resources.

Such a course would likely compromise important U.S. efforts to stave off proposals for planned assignments of these resources at the 1985 and 1988 Space World Administrative Radio Conference.

The field of international satellite communications has been remarkably free of the tension that has marked other areas of international trade. The principal reason for this is the prescience shown by the U.S. in deciding to sponsor and support a single global system — Intelsat.

THE U.S. HAS BEEN A primary beneficiary of that decision, gaining both cost-effective, high-quality communications as well as the positive trade benefits arising from the establishment and operation of the system. Favorable actions on the part of the U.S. government to permit competing international satellite systems would be seen around the world as casual disregard by the U.S.

Such an action would weaken its historic commitment to Intelsat and the objective for which the organization stands. This objective is to guarantee the provision of high-quality satellite communications to all the various areas of the world.

Actual establishment of one or more competitive satellite systems diverting traffic from Intelsat's high-volume routes would have a fundamental impact on the viability of the single global system. It would entail serious financial conseguences to all Intelsat users.

Since the U.S. is by far the largest user of the Intelsat system, U.S. ratepayers would be among those adversely affected by these separate systems, whose proponents claim to be acting in their interests. ■

Peter Crowley, above, is a hospital software writer from Salem, Mass. He submitted this brief anecdote about his early days in communications.

I was filled with a mixture of exhilaration and dread, facing the biggest challenge of my nascent programming career. A raw DP recruit, I faced 60 hours manning the last line of defense protecting 100 hospitals from the menace of computer chaos.

It was my first weekend on call.

Around my living room/command post, I deployed my weaponry: manuals, beeper, a telephone directory, CRT terminal and an unfamiliar meatloaf-shaped object with two padded black orifices — the modem. This was the magic box that would grant me access to faraway computers, allowing me to salvage ruined data files in distant lands with a few masterful keystrokes.

It was 2:30 a.m. when I was roused from dreams of DP derring-do by a call from Metropolis General Hospital. Critical nightly reports had inexplicably stopped printing, and all efforts to restart them had failed. I whipped into action, powering up the CRT and modem with one hand while punching the dial-up number into my telephone with the other.

I deftly swung the handset into the modem, only to discover that no amount of jiggling would persuade my high-tech wall telephone to fit into the modem's receptacle. Undeterred, I swiftly exchanged extension cords, moved the CRT into the dining room and stretched the kitchen telephone line to the modem.

I again hammered in the dial-up number and waited expectantly for the comforting whistle of the hospital's computer. Instead, I heard a languidly erotic female voice whisper, "Hello baby, how's my big sweet hunk?" I diplomatically explained that this dedicated line was not dedicated to the one she loved, and I tried the number again, at last successfully.

I will not detail my brilliantly calculated attack on the problem, whizzing through files, port assignments and job allocations, all in vain. When I called totally frustrated an hour later, the hospital had the explanation.

"The chaplain thought he could print out a patient list for nearby parishes by pushing the Local button," I was told. "We switched the printer back to On Line 45 minutes ago and tried to call you, but your line was busy."

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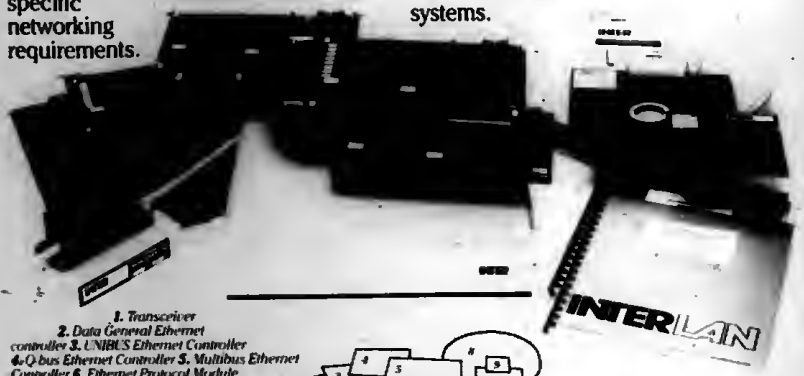

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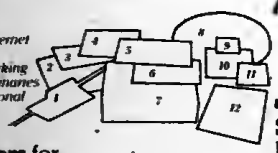

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